CITY AND COUNTY OF SAN FRANCISCO
PLANNING DEPARTMENT
SAN FRANCISCO REDEVELOPMENT AGENCY

SAN FRANCISCO GIANTS BALLPARK AT CHINA BASIN

Draft Environmental Impact Report

Volume II

96.176E

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SAN FRANCISCO GIANTS BALLPARK AT CHINA BASIN

DRAFT ENVIRONMENTAL IMPACT REPORT

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SAN FRANCISCO GIANTS BALLPARK AT CHINA BASIN

DRAFT ENVIRONMENTAL IMPACT REPORT

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A. INITIAL STUDY

I. INTRODUCTION

The San Francisco Giants, a major league baseball team, currently play home games at 3Com Park at Candlestick Point (previously called Candlestick Park). Candlestick Park opened in April 1960 and, at that time seated approximately 42,500. A 1971 renovation of the stadium expanded the seating capacity to approximately 58,000, to accommodate the 49ers football team, which moved from Kezar Stadium in Golden Gate Park. The seating capacity was again increased to the current 70,000 in 1995 to further accommodate the needs of the 49ers.

In recent years three attempts were made to gain San Francisco voter approval of a new baseball park. In 1987 a ballot measure to locate a ballpark at Seventh and Townsend was defeated. A second measure to build a ballpark at China Basin was also defeated in 1989. In late 1995, the San Francisco Giants proposed consideration of a privately financed ballpark at China Basin. The project was placed on the ballot by a majority of the Board of Supervisors and received voter approval in March 1996. The measure amended Part II, Chapter II of the San Francisco Municipal Code, establishing development standards for the new ballpark at China Basin. The purpose of this Initial Study is to identify issues requiring analysis in the Environmental Impact Report (EIR) for the project. Information from the *Mission Bay EIR* (Case No. 86.505E, Final EIR certified August 23, 1990) and preliminary studies prepared for the project were used in preparation of the Initial Study. The *Mission Bay EIR* covers the impacts of potential development in a 300-acre area directly west and south of the project site.

II. PROJECT DESCRIPTION

The project site is adjacent to San Francisco Bay, with its address on King Street near the South Beach area of San Francisco. The site includes Lots 3B, 26, and 27 on Assessor's Block 3794; Pier 46B and Pier 46C (Block 9900); the Second Street right-of-way to the east, and the Berry Street right-of-way. It is bounded by King Street to the north, Third Street to the west and China Basin to the south. The site is located adjacent to San Francisco Bay. It includes Pier 46B, which is used for Port of San Francisco (Port) activities and contains facilities used by tenants and the Port. The Lefty O'Doul Bridge is directly to the southwest of the project site (see Figure 1).

Roughly trapezoidal in shape, the site measures approximately 740 feet along Second Street, 905 feet along King Street, 420 feet along Third Street and 950 feet along China Basin. The total buildable area of the site is approximately 13 acres.

The California State Department of Transportation (Caltrans) owns the northern block of the site bounded by Second, King, Third and Berry Streets. This site was acquired by Caltrans in 1972 to allow extension of Interstate Highway 280, which was not built. The City and County of San Francisco holds in trust the southeastern block bounded by Second, Berry and Third Streets adjacent to China Basin.

The Port has the authority to operate, maintain, regulate and improve the harbor properties of San Francisco that were transferred in trust to the City and County of San Francisco from the State of California with the Burton Act in 1968.

The proposed project involves the construction of a major league ballpark to serve as the home of the Giants, the major league baseball team located in San Francisco. The Giants relocated to San Francisco from the Polo Grounds in New York in 1958, and have played their home games in Candlestick Park (now 3Com Park) since 1960.

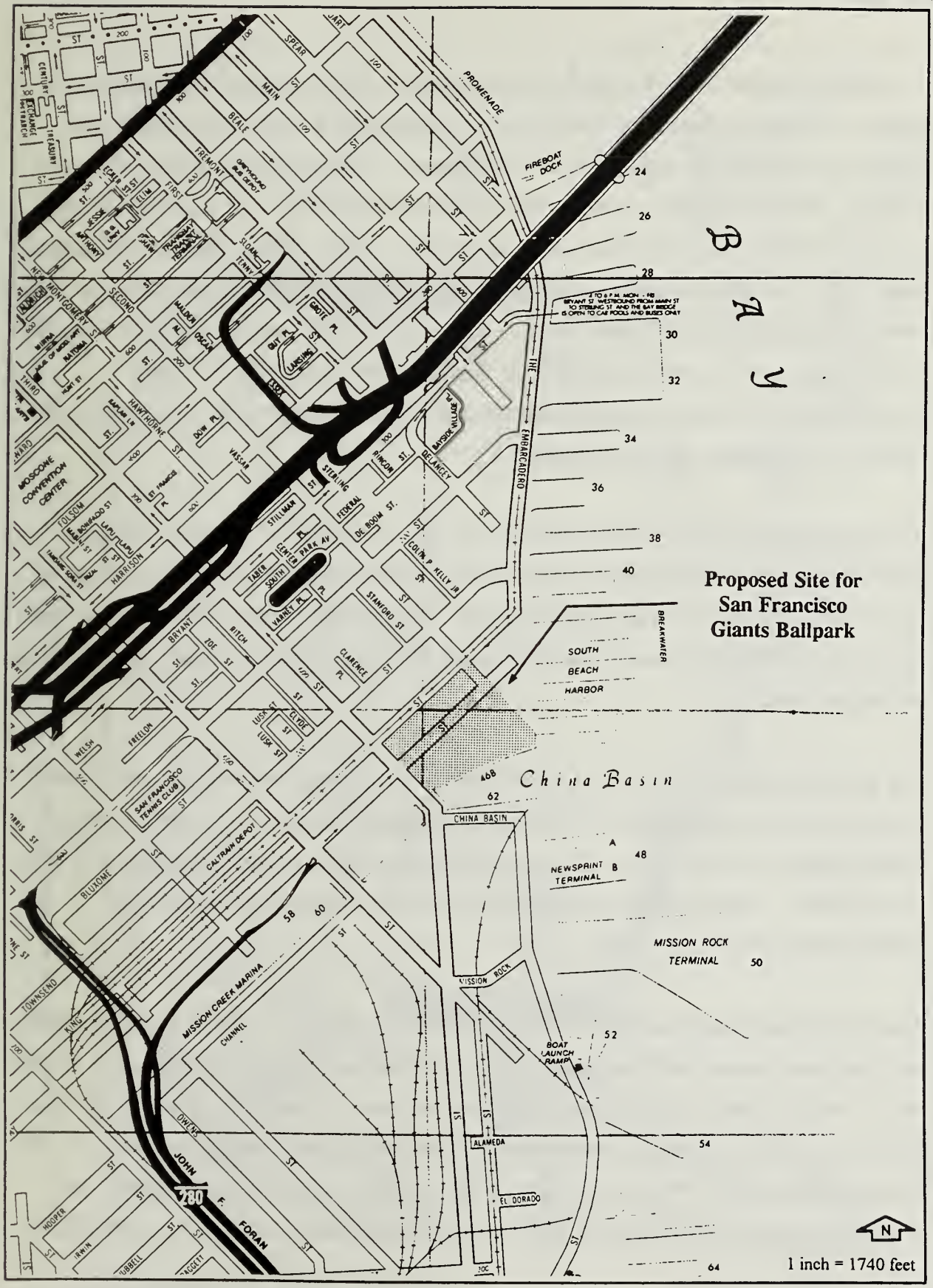

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Figure 1
Project Location

96.176E
Giants Ballpark

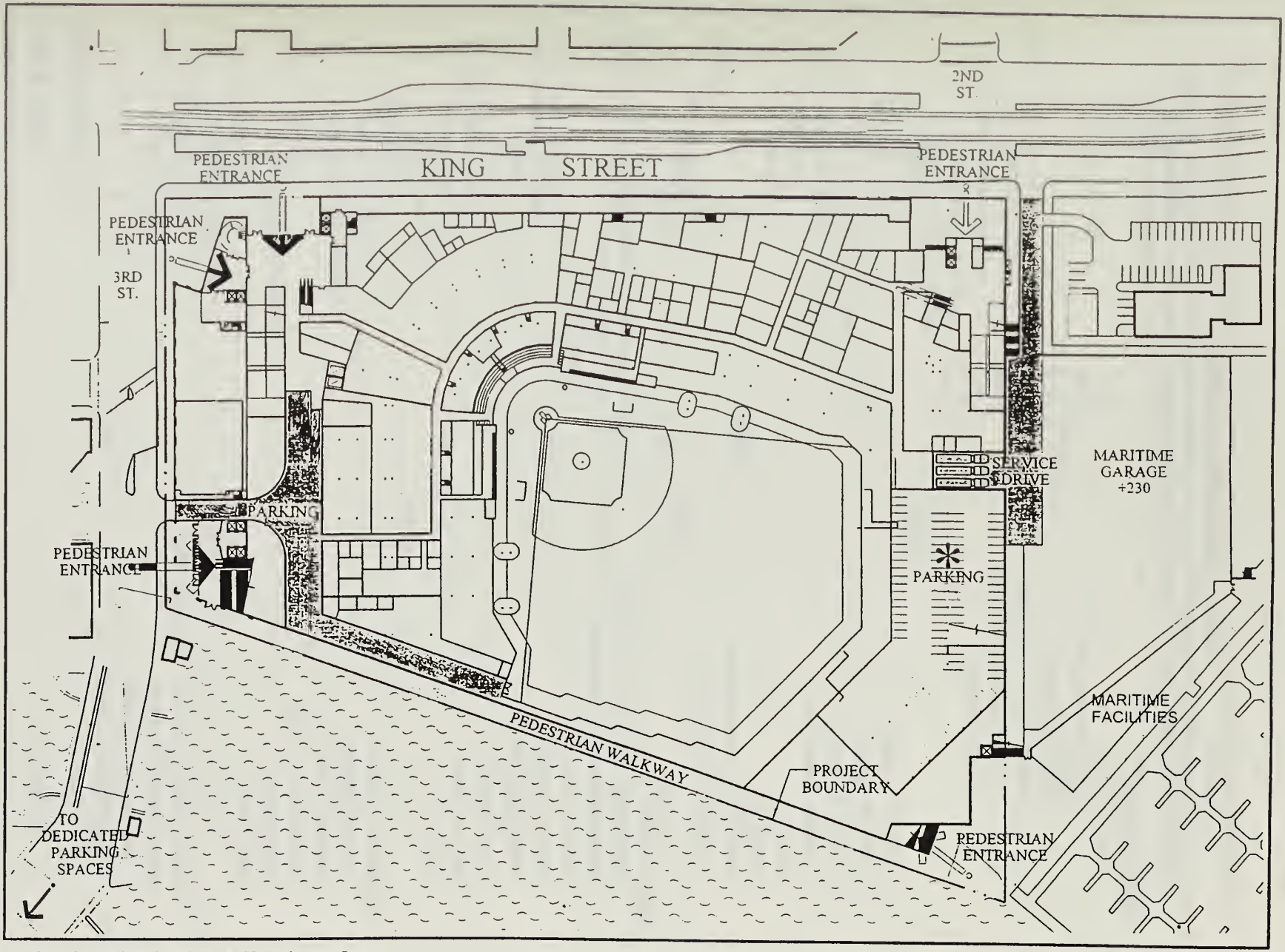
EIP 95298
March 14, 1997

The Giants' ballpark (to be named Pacific Bell Park) would be designed consistent with the tradition of recently constructed baseball parks in Baltimore, Maryland (Camden Yards, home to the Baltimore Orioles) and Denver, Colorado (Coors Field, home to the Colorado Rockies). These ballparks have been designed as urban ballparks, with the location taking account of existing uses, buildings and transportation systems. These ballparks are relatively small, with sight lines designed specifically for baseball, rather than multiple uses, and with viewing unobstructed by structural supports. The existing 22 ft.-wide walkway at Pier 46B, would be improved to provide access to the ballpark from the waterfront. These improvements would involve renovations to the walkway deck to provide a safer pedestrian surface and integration with the ballpark.

At grade, approximately 355,000 square feet (sq. ft.) of the site (64 percent) would be enclosed and serve as the ballpark's service level. Another 132,000 sq. ft. (24 percent) of the site would be covered with the playing field. The ballpark's total gross floor area would be about 1,077,000 gross square feet (gsf), which include all enclosed spaces, the concourses and seating bowl.

The proposed project consists of the construction of the playing field, seating bowl, related facilities and commercial space. The ballpark would have four levels of seating, with a building height of about 140 ft., with the top of the lighting structures rising up to 175 feet (see Figure 2). Seating capacity is estimated at 42,000. Project characteristics are summarized in Table A, p. A.6.

Four levels totaling approximately 45,000 sq. ft. of restaurant/food service would be located just beyond the center field bleacher area. The first and second level, approximately 20,000 sq. ft., would contain a club-type restaurant and bar, open to the public all year. The third level, as currently envisioned, would contain a food court, approximately 10,000 sq. ft., for use on days of games. This area would only be accessible from within the ballpark and would not be open to the general public. The top level, about 15,000 sq. ft., is envisioned



SOURCE: Hellmuth, Obata & Kassabaum, Inc.

Figure 2
Site Plan

TABLE A: BALLPARK COMPONENTS

USES DIRECTLY RELATED TO GAMES AT THE BALLPARK		AREA (sq. ft.)
Spectator Facilities		
Spectator Seating	Seats	
General Admission/Bleachers	26,000	
Club Level Seating	5,000	
Suite and Party Suite Seating	1,000	
Field Club/Lower MVP Seating	8,000	
Upper MVP Seating	2,000	
	42,000	
Subtotal		257,000
Field Club Lounge		
Club Level Lounge		
Concession Stands		
Novelties, Merchandise		
Security		
Restrooms		
First Aid, Fan Accommodation		
Concourses, Stairs, Ramps		
Subtotal		592,000
Press Facilities		
Writing Press, Work Rooms, Dark Rooms		
Broadcast Booths (T.V. and Radio)		
Camera Positions		
Scoreboard Operators		
Video Replay Studio		
Dining Facilities		
Interview Rooms		
Restrooms		
Subtotal		18,000
Administrative Facilities		
Team Management		
Ticketing Offices		
Concessionaires Offices		
Reception		
Retail Offices		
Subtotal		40,000
Clubhouses, Locker Rooms and Related Facilities		
Home Baseball Clubhouse		
Visitor Baseball Clubhouse		
Auxiliary/Umpire's Locker Room		

USES DIRECTLY RELATED TO GAMES AT THE BALLPARK (cont.)		AREA (sq. ft.)
Clubhouses, Locker Rooms and Related Facilities (cont.)		
Internal Batting and Pitching Tunnels		
Dugouts		
Family Waiting Room		
	Subtotal	. 30,000
Stadium Service Facilities		
Guest Services Personnel		
Stadium Maintenance Shops		
Groundskeeper/Engineer Lockers		
Groundskeeper Storage and Office		
Material Storage		
Retail Operations Warehouse		
Food Service Operations, Commissary, Kitchens		
Mechanical/Electrical/Telephone Plant		
Loading Docks		
Trash Collection		
	Subtotal	85,000
Parking		
Three Levels of Parking		
175 spaces	Subtotal	55,000
Subtotal of Uses Directly Related to Games at the Ballpark		**1,077,000**
OTHER USES		
Commercial Facilities		
Waterfront Restaurant	Subtotal	45,000
Pavilion Office Building		
Ground Floor		
Giants Retail Store		43,000
Second Floor		
Pacific Bell Children's Learning Center/ Communications Center		31,000
Third Floor		
Broadcast Facilities/Studio		31,000
Fourth Floor		
Giants Baseball Admin.		31,000
Surface Parking		
50 - 75 spaces		
	Subtotal	136,000
Subtotal of Other Uses		**181,000**
TOTAL AREA		**1,258,000**

as a high-quality restaurant that is oriented toward the water and the playing field, and would be open to the public all year.

A building to contain certain associated functions is planned on the west side of the site adjacent to the ballpark structure. The main pedestrian entrance to the building would face the Third and King Street intersection.

The building is designed on four levels with a total of 136,000 gsf. Occupancy is contemplated in the following manner: ground-level retail; second-level Pacific Bell Children's Learning Center and Communications Center; third-level broadcast studios and facilities; and fourth-level Giants' front offices.

The learning center would include facilities to allow children to access information and knowledge through the use of state-of-the-art computer technology. The Pacific Bell conference center is designed as a briefing and demonstration space. Both facilities would be open from about 10:00 a.m. to 5:00 p.m. The closing time would be extended to about 10:00 p.m. during weeknight ball games.

The third level would be used for commercial broadcast offices, sales, support and show production. The Giants' front office on the fourth level would contain team and ballpark operations.

The ballpark would include baseball facilities with associated circulation concourses, exit and entry stairs, ramps and elevators, as well as concession stands, vendors' commissaries, restrooms and other facilities. The street level of the park (at the bottom of the lowest seating tier and main concourse) would be developed as back-of-house service zones such as concessionaire commissaries, vendor and usher locker rooms, maintenance facilities, groundskeeper facilities, team clubhouses, internal parking spaces, Giants' box office and public entrances. Other levels would include concession stands, kitchen facilities, restrooms, first aid stations and related offices.

The ballpark may be used for events other than baseball on a limited basis. It is estimated that up to 12 could be held, using the ballpark's existing seats and adding temporary seating on the field. These events would occur at varying times. The ballpark's capacity for such events could exceed 50,000 seats. These events can range from music and entertainment presentations to a large civic gathering for the Fourth of July or for the visit of a prominent figure. In addition to these events, additional events might also be held using substantially less than the ballpark's proposed capacity.

Also under consideration is the erection of a small, enclosed amphitheater within the ballpark during the off-season, comprising 5,000 to 15,000 seats, for music concerts and other entertainment events. Up to 40 such events could occur annually. The amphitheater would be a climate-controlled, temporary facility constructed of tensile fabric shaped to cover the infield portion of the baseball field. The amphitheater would include the permanent grandstand seating (excluding the upper deck) between first and third bases. Patrons would enter the amphitheater from one of the baseball park's main entrances behind home plate and use the concession and restroom facilities existing in the permanent structure. Patrons seeking parking would use lots designated for baseball fan parking during the season.

From within San Francisco, the ballpark would be accessible via the Muni Metro. The Muni Metro will run in the median of King Street. A station will be at Second and King Streets next to the ballpark. The CalTrain commuter railroad serves the Peninsula and San Jose, with a station one block from the ballpark site. The ballpark would be accessible from the East Bay and north Peninsula and other San Francisco locations by taking Bay Area Rapid Transit (BART) to the Muni Metro. In addition, direct ferry service is planned from the East Bay and North Bay to the ballpark.

Parking dedicated to the ballpark is planned south of China Basin Channel on properties owned by the Port and the Catellus Development Corporation. The estimated amount of parking proposed on these properties is approximately 5,000 to 6,800 spaces. The project calls for leasing these properties and improving the surface and lighting conditions. These

lots would be used for an interim period, enabling the level of demand for parking at this location to be measured through experience. Permanent parking is expected to be developed in conjunction with the re-planning of the area south of China Basin Channel.

Ballpark parking would also be available at existing parking facilities north of China Basin. The project sponsor intends to seek agreements with operators of selected facilities in order to reserve parking for ballpark use.

The ballpark itself would contain parking for players, administrative staff, selected seat holders and users of other facilities within the ballpark, such as the center field restaurant. Plans call for about 175 spaces to be developed on three levels under the left field bleachers. Access to these spaces would be from King Street at the east end of the site. The driveway would also serve as access to nearby Marina parking.

The proposed project includes an amendment to the Rincon Point-South Beach Redevelopment Plan, including its Design for Development documents. The proposed amendment consists of adding the project area to the plan area, designating its land use and potentially providing certain development standards. The Redevelopment Plan amendment would require approval by the Redevelopment Commission and Board of Supervisors.

The project is also subject to approval by the San Francisco Bay Conservation and Development Commission (BCDC) and the California State Lands Commission (SLC). BCDC has authority over lands that fall within 100 feet of the shoreline. Any ballpark design would be reviewed by BCDC for compliance with public access requirements set forth in the San Francisco Bay Plan and San Francisco Waterfront Special Area Plan.

Pier 46B and the block south of Berry Street are held in public trust by the City and County of San Francisco. Disposition of these properties for the construction of the ballpark would be subject to review by the SLC to determine its compatibility with public trust policies.

The following are the actions required for the project.

- Planning Commission: certification of EIR and adoption of mitigation monitoring program; General Plan amendments; determination of General Plan consistency of Redevelopment Plan amendment and street vacations; and Conditional Use Authorization.

- Port Commission: acquisition of Caltrans parcel; street vacations; ground lease and Public Trust/Burton Act findings; Waterfront Land Use Plan amendment; consistency with Waterfront Land Use Plan.

- Redevelopment Commission: possible joint certification of Draft EIR with the City Planning Commission; Redevelopment Plan amendment; ground lease; Disposition and Development Agreement.

- Board of Supervisors: acquisition of Caltrans parcel; street vacations; ground lease; Redevelopment Plan amendment; General Plan amendments.

- California Transportation Commission: sale of Caltrans parcel.

- Regional Water Quality Control Board: remediation plans.

- SLC: ground lease.

- BCDC: Major Permit.

- Department of Public Works: Parcel Map Approval.

III. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

A. EFFECTS FOUND TO BE POTENTIALLY SIGNIFICANT

The Giants' ballpark is examined in this Initial Study to identify potential effects on the environment (see attached Environmental Evaluation Checklist). Some cumulative impacts and some project-specific effects have been determined to be potentially significant, and will be analyzed in an EIR. These include: cumulative and project-specific land-use effects,

construction and project-specific impacts to aquatic resources, project-specific visual quality impacts, project-related wind impacts, cumulative and project-specific transportation impacts, construction-related and project-specific noise impacts, traffic-generated air quality impacts, seismicity-related impacts and potential impacts related to the previous use of hazardous materials on the site.

The Initial Study identifies any effects of the project that may have the potential for a significant impact on the environment. The EIR will provide a detailed assessment of the effects identified in the Initial Study as potentially significant and identify possible ways to mitigate these impacts.

B. EFFECTS FOUND NOT TO BE SIGNIFICANT

The following potential impacts were determined either to be insignificant or to be mitigated through measures included in the project. These issues require no further environmental analysis in the EIR.

Population: The proposed project does not involve the construction or demolition of any housing units. The majority of the project-specific employment would be filled by employees in similar positions at the existing 3Com Park facility. Employment generated by the construction phase of the project could be filled from the existing regional job force.

Utilities/Public Services: The demand for utilities and public services would be similar to existing demand at 3Com Park. Any increase would be minor and could be provided by existing public service forces and utility facilities.

Biology: The project site is in an urbanized area and does not contain any significant vegetation or habitat. Issues related to potential impacts on aquatic ecology will be discussed in the EIR.

Geology: The project site is mostly flat and does not contain any unique geologic features. The potential seismic hazards, including liquefaction, will be discussed in the EIR.

Water/Hydrology: The site is largely covered by impervious surfaces; therefore, the project would not affect drainage patterns or water quality. Measures to mitigate potential impacts associated with excavation and dewatering are included as part of the project. Potential impacts to San Francisco Bay water quality from construction of the project will be analyzed in the EIR.

Energy/Natural Resources: Energy consumption by the project is expected to be approximately the same as current consumption at 3Com Park at Candlestick Point. Any increases that would otherwise be wasteful or inefficient would be mitigated by the installation of energy-efficient fixtures as part of the project.

Cultural: Records and archival searches for the project area have not identified any known cultural or historical resources on the project site. Former Steamboat Point can be regarded as a location where significant archaeological resources could be discovered during construction. Measures to mitigate any archeological resources are included as part of the project.

ENVIRONMENTAL EVALUATION CHECKLIST

(Initial Study)

File No: 96.176E Title: San Francisco Giants Ballpark

Street Address: N/A Assessor's Block/Lot: Block 3794 - Lots 3B, 26, 27
Pier 46B and 46C (Block 9900)

Initial Study Prepared by: EIP Associates for the City and County of San Francisco

A. COMPATIBILITY WITH EXISTING ZONING AND PLANS

		Not Applicable	Discussed
1.	Discuss any variances, special authorizations, changes proposed to the City Planning Code or Zoning Map, if applicable.	__	X
*2.	Discuss any conflicts with any other adopted environmental plans and goals of the City or Region, if applicable.	__	X

The proposed project site is located within the boundaries of the Northeast China Basin Special Use District and Northeastern Waterfront Plan Area of the San Francisco General Plan. Also applicable to the proposed site or portions of, are the Port of San Francisco Draft Waterfront Land Use Plan, the San Francisco Redevelopment Agency Rincon Point-South Beach Redevelopment Plan, and the City Planning Code and General Plan. Also relevant to the project site are the San Francisco Bay Conservation and Development Commission's San Francisco Bay Plan and Waterfront Special Area Plan and the Bay Area Air Quality Management District (BAAQMD) Clean Air Plans. The relationship of the proposed project to the applicable land use and environmental policies of the documents listed above will be discussed in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

B. ENVIRONMENTAL EFFECTS - Could the project:

	Yes	No	Discussed
1. Land Use			
*a. Disrupt or divide the physical arrangement of an established community?	X	__	X
b. Have any substantial impact upon the existing character of the vicinity?	X	__	X

The proposed project would constitute a change in land use and an increase in the intensity from the existing uses on the site. The proposed project could, potentially, impact existing land uses in the vicinity. The EIR will discuss potential impacts that may result from the changes in land use and the related intensification of the use of the site and the area surrounding the site. The presence of the ballpark could have some growth-inducing impacts. The EIR will discuss how the proposed ballpark could foster and/or speed up development in the project area. If the project is approved and constructed, changes in the use of 3Com Park could occur. These potential changes are speculative at this point and beyond the scope of the project.

	Yes	No	Discussed
2. Visual Quality			
*a. Have a substantial, demonstrable negative aesthetic effect?	X	__	X
b. Substantially degrade or obstruct any scenic view or vista now observed from public areas?	X	__	X
c. Generate obtrusive light or glare substantially impacting other properties?	X	___	X

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The EIR will discuss the proposed project's appearance and possible impacts on views of the site and of the Bay. The EIR will also discuss the potential impacts from the additional lighting of the ballpark and the proposed parking areas.

3. Population	Yes	No	Discussed
*a. Induce substantial growth or concentration of population?	__	X	X
*b. Displace a large number of people (involving either housing or employment)?	__	X	X
c. Create a substantial demand for additional housing in San Francisco, or substantially reduce the housing supply?	__	X	X

The proposed ballpark would provide a facility for an existing sports team as a replacement for 3Com Park at Candlestick Point. The Giants would move their entire operation and staff to the new facility and are not expected to experience any major changes in employment as a result of the move. The proposed ballpark development does not include residential uses or any other features that would contribute to a change in permanent (or resident) population, in either the vicinity of the development, in the city, or in the region as a whole.

The proposed ballpark would not displace any existing housing units at the site, or introduce any housing to the area. The ballpark development proposal is primarily for a sports facility and does not include any features which would induce substantial population growth or demand for housing. The proposed project would have no substantial effect on regional, city or neighborhood housing resources.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Construction of the ballpark would add to citywide and regional employment on a temporary basis during the site clearing and construction phases of the project. The project construction contractor has estimated the demolition/site clearing phase to employ approximately 75 total full-time workers over a six-month period (October 1, 1997 to March 30, 1998). The construction phase would occur over an estimated two-year-plus period (January 1, 1998 to February 28, 2000) and would employ a total of about 800 full-time workers.[1] It is anticipated that the construction workforce would be drawn from throughout the Bay Area region. Association of Bay Area Governments (ABAG) has estimated the Bay Area regional construction workforce at 135,420 persons in 1995, and projected this workforce segment to increase to 160,610 persons by year 2000. According to the ABAG estimates, adequate construction workforce is available in the Bay Area to provide for the needs of the proposed project.

The project sponsor has indicated that the Giants would move their entire operation, including their executive, administrative, training and support staff, from 3Com Park at Candlestick Point to facilities at the new stadium. A marginal increase in employment for the Giants staff could occur in conjunction with increased attendance.

The operations phase of the proposed ballpark has been estimated by the project sponsor to require up to 1,300 part-time jobs during home baseball games (83 home games are estimated for the average baseball season).[2] These jobs would include cashiers, parking directors, parking lot clean-up, recycling personnel, guest services staff, mezzanine staff, security guards, ticket sellers, ticket takers, ushers and janitorial staff. These jobs are expected to be filled mostly from the services segment of the Bay Area region workforce, which is estimated by ABAG for 1995 at 1,080,850 persons, and projected to increase to 1,195,380 persons by year 2000. On the basis of the ABAG estimates, the Bay Area workforce can provide the necessary staff for the ballpark operations phase. It is also likely that at least some of these jobs would be filled by persons currently employed in the same capacity at 3Com Park at Candlestick Point.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The ballpark would also include some features that would be operated full-time throughout the year, separate from game-related activities, and would provide capacity for potential employment. These features include about: 45,000 sq. ft. of restaurant use; 31,000 sq. ft. of Giants' office space; 43,000 sq. ft. of Giants' retail space; 31,000 sq. ft. of space for the Pacific Bell Children's Learning Center/Communications Center; and 31,000 sq. ft. of broadcasting space. The restaurant space is estimated to have the capacity to employ as many as 150 persons. Existing employees at 3Com Park would be transferred to the Giants' offices. Employees of the broadcast studio would be transferred from other locations. The total retail space is estimated to have employment capacity for approximately 115 persons. Employment that would be generated by these facilities are anticipated to be drawn from both citywide and regional workforces. ABAG estimates identify total 1995 Bay Area regional workforce (including San Francisco) at 3,028,290 persons, with a year 2000 projection of 3,298,800 persons.

Construction of the ballpark would replace existing commercial/industrial/office and some maritime-related uses in ten buildings presently occupying the site along both sides of Berry Street, between Second and Third Streets. Previous investigations in the area (*Mission Bay Final EIR*), identified about 170 commercial/industrial workers, and about 90 office workers north of Berry Street, that were estimated to be displaced by ballpark construction. Actual numbers of workers affected at this portion of the site may prove to be smaller than previously estimated, because approximately ten buildings north of Berry Street (which were factors included in the previous employment estimates) have since been demolished. South of Berry Street and north of China Basin (Pier 46B), most of the potentially displaced uses are maritime-related activities, where several active tugboats operate. The San Francisco Port Commission has decided to relocate the existing maintenance facility at Pier 46B to more modern and efficient facilities. No specific new location has been identified at this time. Displacement of existing employment south of Berry Street is estimated at about 40 persons. It is anticipated that all existing operations could be successfully relocated within areas of similar land use in the city. Relocation opportunities for displaced maritime-related

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

activities requiring close or direct access to the waterfront may be more limited in San Francisco, than would replacement sites for the other relocations, but would be sufficient to serve existing maritime activities.

NOTES: Population

1. Jack Bair, Vice President and General Counsel, San Francisco Giants, telephone conversation with EIP Associates, October 10, 1996.

2. Jack Bair, Vice President and General Counsel, San Francisco Giants, letter to William E. Hurrell, Regional Vice President, Wilbur Smith Associates, October 10, 1996.

4. Transportation/Circulation	Yes	No	Discussed
*a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	X	__	X
b. Interfere with existing transportation systems, causing substantial alterations to circulation patterns or major traffic hazards?	X	__	X
c. Cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity?	X	__	X
d. Cause a substantial increase in parking demand which cannot be accommodated by existing parking facilities?	X	__	X

The EIR will include an analysis and discussion of potential impacts and issues related to: traffic on local and regional streets and freeways, site access and service delivery, parking, transit, pedestrians and bicycles. The analysis will evaluate four time scenarios reflective of game times and weekday commute times for the year-round uses.

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*Derived from State EIR Guidelines, Appendix G, normally significant effect.

5. Noise	Yes	No	Discussed
*a. Increase substantially the ambient noise levels for adjoining areas?	X	__	X
b. Violate Title 24 Noise Insulation Standards, if applicable?	__	X	X
c. Be substantially impacted by existing noise levels?	__	X	X

The proposed project would introduce new noise sources including construction-related noise (pile-driving), crowd noise, amplified loud speaker noise, music from concert events, increased auto traffic and transit use. The EIR will discuss the potential impacts from these new noise sources.

6. Air Quality/Climate	Yes	No	Discussed
*a. Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation?	X	__	X
*b. Expose sensitive receptors to substantial pollutant concentrations?	__	X	X
c. Permeate its vicinity with objectionable odors?	__	X	__
d. Alter wind, moisture or temperature (including sun shading effects) so as to substantially affect public areas, or change the climate either in the community or region?	X	__	X

Regional automobile emissions from the project would be similar to the emissions generated from vehicles traveling to and from 3Com Park. The transit accessibility of the proposal's location would serve to reduce the number of those coming to the ballpark via an

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

automobile. This would result in a similar or smaller number of trips to and from the ballpark even if attendance increased as anticipated. These emissions are currently measured at BAAQMD stations are part of the regional air quality setting and will not be analyzed further in the EIR.

Potential air quality impacts from the proposed project could occur as the result of increased local and vehicular traffic. This could result in an effect on the eight-hour carbon monoxide concentrations along congested streets and at congested intersections. The EIR will analyze and discuss potential air quality impacts related to the increased local vehicular traffic.

Section 295 of the City Planning Code was adopted in response to Proposition K (passed November 1984) in order to protect certain public open spaces from shadowing by new structures that are not in redevelopment areas during the period between one hour after sunrise and one hour before sunset, year round. Section 295 restricts new shadow upon public spaces under the jurisdiction of the Recreation and Park Department by any structure exceeding 40 feet unless the City Planning Commission finds the impact to be insignificant. A shadow fan analysis was prepared by the Department of City Planning. This analysis determined that the project shadow would not shade public areas subject to Section 295. (A copy of the shadow fan analysis is available for review at the Department of City Planning, 1660 Mission Street.) The EIR will include an analysis of shadowing on South Beach Park and on the area proposed for the extension of South Beach Park.

The EIR will include a discussion of wind speed and turbulence intensity at selected locations along the pedestrian areas, open spaces, and within interior decks in the proposed project.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

7. Utilities/Public Services	Yes	No	Discussed
*a. Breach published national, state or local standards relating to solid waste or litter control?	__	X	X
*b. Extend a sewer trunk line with capacity to serve new development?	__	X	X
c. Substantially increase demand for schools, recreation or other public facilities?	__	X	X
d. Require major expansion of power, water, or communications facilities?	__	X	X

The proposed project has the potential to add to the cumulative demand for public services and utilities. Most of this demand, however, would be similar to what is currently generated at 3Com Park at Candlestick Point during baseball season and would be offset by the reduction of services at 3Com after the move. There would be some additional demand from the year-round uses. This increase would not be substantial. This new demand would be anticipated as part of continuing urban development and would not increase the regional demand for energy.

The proposed project would require community services in the form of police, fire and emergency medical services during the baseball season. These services would be similar to what is currently provided at 3Com Park at Candlestick Point, so would represent a shift in location rather than a citywide increase in the demand for services.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Police and Traffic Control Services

The San Francisco Police Department and the Department of Parking and Traffic routinely provide protection and traffic-control services during baseball games at 3Com Park at Candlestick Point. Similar services are expected to be provided at the proposed ballpark. Police services at baseball games fall into two administrative categories: Special Law Enforcement Services (SLES) and regular-duty services.

SLES services are provided at the request of the Giants organization, which pays for the service, and involves stationing police officers inside the main gate of the ballpark. During the 1995 baseball season, a minimum ("base" level) of 15 Police Department personnel per game were assigned to SLES duties. In 1996, a minimum of 13 police officers per game are planned for SLES duty. Depending on attendance and other factors, the size of the SLES force may increase to as many as 40 officers.

The Police Department along with the Department of Parking and Traffic also assigns regular-duty personnel outside the ballpark, mainly for patrolling parking lots and for traffic control. The cost of services are part of the departmental budget and are not reimbursed by the Giants. On average, 20 police officers and between 8 and 16 parking control officers are assigned to regular duty outside the ballpark.

According to the Department, police activities at the ballpark include citations, ejections from the ballpark and arrests, and usually involve intoxication and related "low-level assaults." The number of incidents vary depending on attendance and schedule, but range between 2 to 6 citations or arrests per game and up to 12 ejections per game. Night games, particularly Friday night games, typically involve a greater number of incidents.

Assuming a move to the new ballpark, the Police Department's existing resources should be sufficient to sustain the level of service currently provided at 3Com Park. The Department

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

anticipates that providing police and traffic-control services to the new ballpark would not take away resources from other community efforts.[1] Concern has been expressed with regard to the ability of the Police Department to handle special events at the ballpark. Appropriate police coverage for activities other than ballgames would need to be arranged through the Police Department's Special Events Management and Planning Unit. Since such activities require advance scheduling, additional officers could be scheduled without impacting the Department's daily duties.[2]

Concerns have been expressed regarding potential secondary effects of the ballpark on police services resulting from growth in surrounding commercial facilities, such as sports bars. This issue will be discussed in the growth inducement section of the EIR.

Fire and Emergency Medical services

On average at 3Com Park there are fewer than 20 fire department calls per baseball season, the majority of which are for emergency medical services, such as heart attacks and severe falls, that exceed the capability of the ballpark's on-site first aid and medical services. The Giants provide extensive on-site medical services, including a first-aid station, an ambulance stationed at the ballpark, between one and three on-site nurses, and a rotating cadre of on-call physicians. This medical service capability is expected to be provided at the proposed ballpark. The Giants also maintain extensive emergency evacuation plans and capabilities, which were exercised most recently in the 1989 Loma Prieta earthquake.

Fire alarms at 3Com Park have typically involved dumpster fires and other low-level incidents. These events can usually be handled by the ballpark staff. The proposed project would include fire extinguishers as required by the Fire Department. In the event of a first alarm fire or medical emergency at the proposed ballpark, the following San Francisco Fire Department companies would respond:[3]

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Company	Location	Personnel
Engine 8	36 Bluxome Street	1 officer and 3 firefighters
Truck 8	36 Bluxome Street	1 officer and 4 firefighters
Battalion 3	36 Bluxome Street	Battalion Chief and Operator
Engine 1	676 Howard Street	1 officer and 3 firefighters
Truck 1	676 Howard Street	1 officer and 4 firefighters
Rescue Squad	676 Howard Street	1 officer and 3 firefighters
Engine 35	Harrison Pier 22 ½	1 officer and 3 firefighters
Division 3	2300 Folsom Street	Assistant Chief and Operator

In several respects, fire and emergency medical services would improve at the proposed ballpark. According to the Fire Department, there are more high pressure water hydrants and fire stations near the China Basin site than at 3Com Park. Response times for both fire and medical emergencies are, therefore, expected to improve compared to response time at 3Com Park.[4] Newer building code provisions requiring advanced sprinkler and alarm systems would also improve fire protection capabilities at the new ballpark.

Since there is no reason to expect a greater number of fire or medical emergencies at the new ballpark, the Giants' move to China Basin should not create an additional demand for Fire Department services, and since response times and fire-fighting capabilities would improve at China Basin, the overall effect of the move would be positive.[5]

Public School Services

The construction and operation of the proposed ballpark is not expected to cause a substantial increase in residential development in the area. New demand for public school facilities or staff is, therefore, not anticipated.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Water Usage

Currently 3Com Park at Candlestick Point consumes an average of 1,980,000 gallons per month during the baseball season. Most of the water is used for watering the playing field and for washing down seating areas, ramps and concourses after games. It is expected that water demand would be approximately the same at the new ballpark. Some increase may be expected due to higher attendance and consequently more extensive cleaning needs after the game. This increase may be offset by several factors. These include the planned utilization of more water-efficient equipment, including cleaning machines that recycle water.

Solid Waste Disposal

Each month during baseball season, solid waste from 3Com Park at Candlestick Point fills (or partially fills) approximately 310 three-cubic-yard dumpsters within the stadium and 18 four-cubic-yard dumpsters in the parking lots. Assuming the dumpsters are full when emptied, approximately 1,002 cubic yards of solid waste would be generated each month at 3Com Park -- or about 7,014 cubic yards per season (in a seven-month season). Using standard volume-to-weight conversion factors for loose (*in situ*) refuse, 3Com Park would generate about 1,227 tons per season (average conversion factor of 350 pounds per cubic yard provided by the California Integrated Waste Management Board). It is expected that the new ballpark would generate about the same quantity of solid waste, or somewhat more, given the anticipated attendance increase and expanded concession and dining facilities. This quantity would also vary depending on the effectiveness of source reduction and recycling measures.

Environmental impacts from the generation of solid waste can be mitigated by recycling and source reduction measures. The Giants currently recycle approximately 27,000 pounds of materials during the baseball season at 3Com Park at Candlestick Point. At least the same

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

recycling rates may be expected at the new ballpark -- or probably more given the Giants' plan to increase the number of recycling receptacles and to implement more extensive public education programs. The Giants propose to retrieve aluminum, plastic, and glass from recycling bins stationed throughout the new ballpark.

Solid waste generated at the new ballpark would be offset by a corresponding decrease at 3Com Park at Candlestick Point. Although some increase in generation may be expected because of increased attendance and expanded food services, the amount would be small and would be addressed by the enhanced recycling programs noted above. Solid waste collected at the proposed new ballpark would go to the same landfill currently utilized by the 3Com Park at Candlestick Point waste haulers.

The Giants plan to install energy-efficient and cost-saving solid waste handling equipment at the new ballpark, including high-capacity trash compactors and cardboard balers. This equipment would reduce the number of truck service calls for the same quantity of garbage and thereby mitigate the energy impacts of solid waste generation. Such equipment is not currently employed at 3Com Park.

Wastewater

Wastewater would be generated at the ballpark as a result of the normal operation of water-using facilities in food service areas, restrooms, and during washdown operations. This would be similar to the wastewater generated at 3Com Park. Additional wastewater would be generated by the proposed commercial and restaurant uses. Wastewater and stormwater in the project area are treated at the Southeast Water Pollution Control Plant. Baseball games would be played during dry weather and would not contribute to conditions that cause odors during wet weather overflows.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The Southeast plant has a peak treatment capacity of 250 mgd. Currently, average inflow to this plant ranges from about 65 mgd during the night to approximately 85 mgd during the day, resulting in a surplus design capacity of approximately 165 to 185 mgd. There are no capacity constraints that would restrict future development in the area served by the Southeast plant.[6] The adequacy of the existing sewer lines to convey the wastewater from the proposed development will be analyzed in the EIR.

NOTES: Utilities/Public Services

1. Lt. Don Carlson, San Francisco Police Department, conversation with EIP Associates, March 13, 1996.

2. Lt. Don Carlson, San Francisco Police Department, conversation with EIP Associates, 1996.

3. Frank Scales, Assistant Deputy Chief, Support Services, San Francisco Fire Department, letter to EIP Associates, March 11, 1996.

4. Frank Scales, Assistant Deputy Chief, Support Services, San Francisco Fire Department, letter to EIP Associates, March 11, 1996.

5. Frank Scales, Assistant Deputy Chief, Support Services, San Francisco Fire Department, letter to EIP Associates, March 11, 1996.

6. Tony Flores, Bayside Operations Superintendent, Department of Public Works, telephone conversation, June 14, 1996.

8. Biology	Yes	No	Discussed
*a. Substantially affect a rare or endangered species of animal or plant, or the habitat of the species?	__	X	X

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

*b.	Substantially diminish habitat for fish, wildlife or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species?	X	__	X
c.	Require removal of substantial numbers of mature, scenic trees?	__	X	X

Vegetation

The original marsh and bayland plant community has been almost completely eliminated by the filling of Mission Bay in the late 1800s. The site is now completely urbanized with upland vegetation limited to non-native ruderal ("weedy") species growing in vacant lands. Ornamental landscaping plantings in the vicinity are limited to the Channel Street Pump Station at Seventh and Berry Streets, the houseboat community at the west end of China Basin Channel, and the boardwalk of the China Basin Building between Third and Fourth Streets. The majority of the site is covered with structures and impermeable surfaces. The only native vegetation in the area occurs as a fringe of salt marsh vegetation dominated by pickleweed (*Salicornia virginica*), which forms an intermittent narrow band of from 0.5 to 1.5 meters wide along the line of mean high water in the China Basin Channel. Because of the highly urbanized nature of the site, there are no surviving occurrences of federal- or state-listed or proposed rare, threatened or endangered plant species, candidates for such listings, or any other special status plant species, and no suitable habitat for such species occurs in the project area.

Wildlife

Terrestrial birds in the area are limited to species adapted to urbanization and human presence such as English sparrows, starlings, and Brewer's blackbirds. The urbanized

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

character and lack of suitable cover and food sources limits occurrences of terrestrial mammals to those species adapted to urban environments. These include Norway rats, house mouse, meadow mouse, and gopher, in addition to domestic and feral cats and dogs.

The California brown pelican (*Pelecanus occidentalis*), listed as endangered by both the state and federal governments, is the only sensitive animal species known to occur in the vicinity. Pelicans have been observed in the aquatic habitats or adjacent areas of China Basin. Pelicans are regular summer visitors to the San Francisco Bay, but their numbers in the project area are low due to inadequate supplies of food, primarily northern anchovy and top smelt. Harbor seals (*Phoca vitulina richardii*) and California sea lions (*Zalophus californianus*) are regular visitors to the outer reaches of China Basin Channel.

Direct impacts to the native salt marsh community along the shoreline of China Basin are not anticipated because no development would occur there. The project area is already subjected to disturbances typical of a highly urbanized setting. Losses of ruderal vegetation from project development are considered less than significant because of the non-native origin of plant species in that vegetation type, its common and widespread nature, and the fact that ruderal vegetation is aggressive in colonizing new areas and is, therefore, easily replaceable. Losses of any ornamental landscape vegetation would be considered less than significant because of its predominantly non-native origin, low habitat value, common and widespread distribution, and easily replaceable characteristics. Losses of urban habitat for rats, mice, starlings, sparrows, and blackbirds are considered less than significant because they are primarily non-native species, are easily adapted to urban surroundings and as a result are common and widespread in the region. There would be no impact to sensitive terrestrial plants or animals, because no populations or suitable habitat occurs in the project area due to urbanization. A list of birds observed in the area of the Channel between September 29, 1987 and February 26, 1988 was reviewed. No further study will be included in the EIR. No rare or endangered species have been identified on the site.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The previous Development Agreement included provisions for the creation of wetlands. This provision was a part of an overall land use approach in the Mission Bay Plan for which the Development Agreement has now expired.

The EIR will include analysis and discussion of potential impacts from construction and operation of the project related to San Francisco Bay aquatic ecology. This will include potential impacts during construction and operation to the Pacific herring, particularly during spawning season. The EIR will also discuss potential impacts related to increased activity of the site (such as litter) on Bay resources.

9. Geology/Topography	Yes	No	Discussed
*a. Expose people or structures to major geologic hazards (slides, subsidence, erosion and liquefaction)?	X	__	X
b. Change substantially the topography or any unique geologic or physical features of the site?	__	X	X

The project area is subject to earthquake-induced hazards. The project site is in a San Francisco Special Geologic Study Area for the potential ground failure hazards of liquefaction and settlement. As such, the City and County of San Francisco requires that all new development on the site be preceded by special site-specific investigations to determine the type and degree of hazards present, the appropriate engineering designs to ameliorate the hazards, and the appropriateness of increasing the human population in a Special Geologic Study Area.[1] The seismic hazards, including liquefaction, will be discussed in the EIR. Seismic safety issues related to the design and connection of non-structural elements will be included in the EIR discussion.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The geologic issues of topography, settlement, and unique geologic features are discussed below; further discussion will not be needed in the EIR.

The site of the proposed ballpark is adjacent to China Basin Channel and the Mission Bay Planning Area. The site's geologic characteristics are similar to those of the portion of the Mission Bay Planning Area north of China Basin Channel in nearly all respects. Filling, grading, and construction have created a site that is mostly flat, slopes very gently toward San Francisco Bay, and is about 8 to 12 feet above mean sea level (0 to +4 feet San Francisco City Datum).[2] There are no known unique geologic features at the site. The surface of the site is composed entirely of artificial fill, mostly unengineered, placed in a shallow inlet during the general filling of Bay-side areas in San Francisco between 1850 and about 1915. The thickness of fill varies, but is known (from a US Geological Survey test boring) to be 45 feet near the Lefty O'Doul Bridge at Third Street.[3] Below the fill is 20 to 80 feet of Bay Mud, underlain by a discontinuous layer of sandy alluvium as much as 30 feet thick. The alluvium is underlain by as much as 40 feet of Old Bay Clay, a dense sandy clay that rests on the Franciscan bedrock (mostly sandstone) at least 98 feet below the ground surface.[4]

The artificial fill and underlying Bay Mud at the site of the proposed ballpark are not suitable as foundation support for large or heavy structures because they are subject to settlement. The weight of structures founded on these materials could cause them to compress or shift, thus causing the structure to sink (settle), which, in turn, could damage the foundations, floor slabs, and frame of the structure. The alluvium, Old Bay Clay and bedrock are suitable for foundation support. Foundation types, such as deep piles or mats or footings interconnected with ties, that derived their support from these lower horizons would be appropriate when designed specifically for this site. The project engineer would work with a local geotechnical engineer to develop and evaluate site-specific soil and seismic data for use in the design and construction of the proposed foundations. Various methods of reducing settlement hazards (such as soil removal and replacement, soil compaction, chemical stabilization, installation of

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

drains) would be evaluated, as necessary, if anticipated settlement rates or amounts appeared excessive.[5]

Construction of the proposed ballpark and ancillary facilities on the site would cover the entire ground surface with new structures or landscaping, but would cause no substantial change in the essentially flat surface of the site's topography. At present, these activities are scheduled to occur during the rainy season, so a Storm Water Pollution Prevention Plan would be prepared and implemented by the project sponsor (see Water, below). The EIR will discuss the condition of the existing bulkhead and Port Walk and any proposed improvements.

NOTES: Geology/Topography

1. City and County of San *Francisco, Community Safety Element of the San Francisco Master Plan*, adopted by Resolution 7241 of the San Francisco Planning Commission, September 12, 1974, 24 pages, 13 figures (various scales).

2. City and County of San Francisco, Department of City Planning, *Mission Bay Final Environmental Impact Report*, SCH No. 86070113, August 23, 1990, Volume II, p. VI.K.1. San Francisco City Datum is 8.66 feet above mean sea level datum.

3. Schlocker, J.C., *Geology of the San Francisco North Quadrangle, California*, United States Geological Survey, Professional Paper 782, Washington, D.C., 1974, 109 pages, 67 figures, 3 plates, map scale 1:24 000.

4. Treadwell & Rollo, Inc., Environmental and Geotechnical Consultants, L. A. Simpson, Professional Engineer, and F. L. Rollo, Professional Engineer, *Proposed UCSF Site, Mission Bay, San Francisco, CA*, letter report to Kerstin Magary, Catellus Development Corporation, October 31, 1994, 2 pages accompanied by 38 figures.

5. Charles P. Thornton, Ph.D., PE, Principal of Thornton-Tomasetti/Engineers, letter to Joseph Spear, Senior Vice President, Hellmuth, Obata & Kassabaum Inc., February 27, 1996.

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*Derived from State EIR Guidelines, Appendix G, normally significant effect.

10. Water	Yes	No	Discussed
*a. Substantially degrade water quality, or contaminate a public water supply?	__	X	X
*b. Substantially degrade or deplete ground water resources, or interfere substantially with ground water recharge?	__	X	X
*c. Cause substantial flooding, erosion or siltation?	__	X	X

The San Francisco General Plan indicates that the site is in an area of potential tsunami inundation hazard. The tsunami hazard will be discussed in the EIR as part of the Seismicity discussion.

Drainage and water quality issues (with the exception of contaminated groundwater) are discussed below, and will need no further discussion in the EIR.

Previous testing of groundwater samples in the vicinity of the proposed project site indicates that the groundwater is brackish (water with a salinity between that of fresh (non-saline) water and sea water) and may be contaminated with sewage (coliform counts in a groundwater sample were far in excess of safe drinking water standards).[1] The groundwater is likely to contain trace amounts of some hazardous materials deposited on the surface or in the soil over the past 125 years by industries operating in and adjacent to the site. Underground storage tanks also are potential sources for contaminants released into surrounding soils and groundwater. The degree of contamination depends on several factors including pollutant characteristics, soil type and thickness, depth to groundwater, and hydrologic characteristics of the site.[2] Contaminated groundwater issues will be discussed in the EIR as part of the discussion of hazardous materials.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

There are no surface water resources o n the site now, but the site was part of China Basin, Mission Bay, and San Francisco Bay until the area was filled between 1850 and about 1915. The groundwater table beneath the site varies between 4 feet and 10 feet below the ground surface, approximately the tidally-controlled elevations of San Francisco Bay adjacent to the site. There is no use of groundwater at the site. Ground water is not expected to be developed in the future as a drinking water source.[3]

The proposed project would not rely on groundwater for any uses, either as a water source or as a disposal location. If a pile design were selected for the proposed ballpark, support piles could be driven from the ground surface or a shallow drive pit, thereby avoiding the need to excavate below the water table, and avoiding the need to dewater the site.

If dewatering becomes necessary during excavation (for example, to remove underground tanks or to establish drive pits for foundation support construction), and the groundwater contains hazardous waste, the water would have to be decontaminated prior to disposal. The city would categorize this wastewater as a batch wastewater discharge in accordance with the city's Industrial Waste Ordinance.[4] The Giants would need to file an application for a discharge permit 45 days prior to the proposed commencement of the discharge.[5] The city would require the proposed discharge to be sampled and tested, which must satisfy the limits specified by the city before the city allows the discharge to enter the sewer.

Because of existing groundwater contamination, the city would require specific substances related to hazardous waste contamination to be tested. If the analysis revealed any contaminant to be over its regulatory concentration limit, pre-treatment of the dewatered groundwater to meet the allowable concentration limit would be required prior to discharge into the sewer system.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Groundwater clean-up measures may include groundwater pumping, air stripping, extraction, and filtration. If the limit cannot be met through pre-treatment, the contaminated dewatered groundwater must be disposed off-site at an approved facility.

To further reduce the possibility that construction activities would create a risk of contaminating the groundwater, or could cause exposure to pre-existing contaminated groundwater, the project sponsor would prepare and implement a Construction Hazardous Materials Management Plan that would include considerations for the handling of chemical releases, fuel spills, and leaking underground storage tanks. Potential exposure issues and the Plan to mitigate them will be discussed further in the EIR as part of the discussion of hazardous materials.

The site is now developed with urban uses, most of which are impermeable with high runoff rates (rooftops, paved parking, streets), although some minor unpaved, more permeable areas of compacted soil do exist along the edge of the marina and in the vicinity of old railroad tracks and outdoor loading and storage areas. Following construction of the proposed ballpark facilities, this mix of runoff factors would remain essentially unchanged, or would be weighted slightly toward more infiltration. The ballpark and its approaches would be paved, whereas the playing field and newly landscaped areas would account for at least as much infiltration space as the present unpaved areas. Stormwater runoff from the site of the proposed project and most of the nearby area is collected in storm drains connected to the City's combined stormwater and sanitary sewer system. Because not all the piers and land areas in the vicinity of the site are equipped with storm drains, some runoff enters the Bay directly. In the limited unpaved areas rainwater can infiltrate the soil and percolate to the underlying groundwater table. The playing field would be designed with a sub-drainage system that connects to the City's sewer system. During dry weather, the storm/sewer system conveys all wastewater collected from the site to Southeast Water Pollution Control Plant for treatment. During wet weather, the storage capacity of the system sometimes is exceeded, and overflows occur at six overflow structures along China Basin Channel. A

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

variety of chemical materials and industrial by-products including solvents, fuels, and waste materials, contribute contaminants to the runoff overflows through accidental spills or intentional illegal dumping. Constituents found in the overflows also include bacteria, suspended solids, and ammonia typically found in sanitary sewage, but at lower concentrations because of dilution by stormwater. However, these concentrations still exceed standards for municipal use, water contact recreation, and shellfish harvesting.[6]

The site would continue to drain to the City's combined storm/sewer system. The site drainage system would be redesigned as a single lot (rather than the present, fragmented, multiple lot systems) and would drain more efficiently.

During the construction period, fill materials at the site would be exposed to the erosive forces of wind and stormwater runoff, which could reduce the carrying capacity of the storm/sewer system by adding sediment to the pipelines, and could reduce the water quality of the Bay by adding sediments and pollutants to the receiving waters, thereby increasing turbidity and contaminant load.

To reduce the possibility that erosion in construction areas would decrease drainage system capacity and increase sedimentation in San Francisco Bay, a mitigation measure has been included in the project requiring the preparation and implementation of a construction Storm Water Pollution Prevention Plan using Best Management Practices for controlling stormwater quality on-site (see p. 44).

NOTES: Water

1. Dames and Moore, *Geotechnical Consultation, Mission Bay Project*, December 1, 1982, *in* City and County of San Francisco, Department of City Planning, *Mission Bay Final Environmental Impact Report*, SCH No. 86070113, August 23, 1990, Volume II, p. VI.L.5.

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*Derived from State EIR Guidelines, Appendix G, normally significant effect.

2. City and County of San Francisco, Department of City Planning, *Mission Bay Final Environmental Impact Report*, SCH No. 86070113, August 23, 1990, Volume II, p. VI.L.5.

3. Geomatrix, *Draft Site Investigation Report and Risk Evaluation, Giants Pacific Bell Park Site, San Francisco, California, Volume I*, Prepared for China Basin Ballpark Company, LLC, September 1996, pp. 2-3.

4. City and County of San Francisco, Ordinance No. 19-92, San Francisco Municipal Code (Public Works), Part II, Chapter X, Article 4.1 (amended), January 13, 1992.

5. City and County of San Francisco, Department of Public Works, Bureau of Environmental Regulation and Management, Requirements for Batch Wastewater Discharges, April 11, 1994.

6. City and County of San Francisco, Department of City Planning, *Mission Bay Final Environmental Impact Report*, SCH No. 86070113, August 23, 1990, Volume II, pp. VI.L.7-VI.L.9.

11. Energy/Natural Resources	Yes	No	Discussed
*a. Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	__	X	X
b. Have a substantial effect on the potential use, extraction, or depletion of a natural resource?	__	X	X

The proposed ballpark would consume energy in the form of electricity, natural gas and fuel (gasoline and diesel). Energy consumption at the new ballpark is expected to be approximately the same as what is currently consumed at 3Com Park at Candlestick Point during the baseball season. Some increases in electrical and gas consumption may occur because of a planned increase in night games and expanded concession and dining facilities at the new ballpark. These increases would be mitigated by energy-efficient lighting systems and other measures noted below.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

During the baseball season, 3Com Park at Candlestick Point consumes electricity at a rate of about 480,000 kilowatt hours (kWh) per month. Approximately 35 percent of the electricity consumed at 3Com Park is used to light the ballpark during night games.[1] Currently at 3Com Park, about 33 out of 83 home games are played at night, but at China Basin the Giants plan to play up to 50 night games. Assuming no mitigating factors, the additional night games at China Basin would be expected to increase electrical consumption an extra 86,500 kWh per month. For the season, overall electrical usage would increase to 566,500 kWh per month -- a 15 percent increase. Electrical consumption may also increase due to plans to install more concession stands, a fine dining facility, a brew pub and other facilities at China Basin, all of which would require electricity beyond 3Com Park levels.

However, several factors would likely offset some of the electrical consumption increases. Because the proposed ballpark would be smaller and more compact than 3Com Park, lighting and other electrical equipment would be more efficient. In particular, plans to install advanced night field lighting--similar to what is used at Coors Field in Denver--would result in significant improvements in efficiencies because the lights are more focused and energy-efficient. Among other improvements planned for China Basin is the installation of systems to automatically shut off lights when people leave a room, saving electricity.

Although an increase in electrical consumption may be expected at the new ballpark, on balance the increased consumption is not considered a significant environmental effect because it would not put unreasonable additional demands on the City's existing electrical supply or require expansion of facilities nor would it use energy in a wasteful manner due to the energy-efficient design. The expected increase, about 605,500 kWh per season, is the energy equivalent of 357 barrels of oil.

Currently, 3Com Park at Candlestick Point consumes approximately 6,000 therms (4,300 cubic feet) of natural gas per month during the baseball season. Natural gas, supplied by Pacific Gas & Electric Company, is mainly used for heating food at concession stands and

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

dining facilities and for heating administrative offices. Factors that may increase natural gas consumption at the proposed ballpark include more concession stands and dining operations, and increased attendance. Factors mitigating the increase would include increased efficiencies from stricter construction standards, better insulation, newer, more energy-efficient concession equipment, and a somewhat warmer climate at the new site. The increase in gas consumption would not encourage the wasteful use of energy, or involve extensive new demand on natural gas supplies or require provision of new natural gas capacity.

NOTES: Energy/Natural Resources

1. Jorge Costa, Operations, San Francisco Giants, telephone conversation with EIP Associates, March 12, 1996.

12. Hazards	Yes	No	Discussed
*a. Create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people or animal or plant populations in the area affected?	X	__	X
b. Interfere with emergency response plans or emergency evacuation plans?	X	__	X
c. Create a potentially substantial fire hazard?	__	X	X

The project would, on game days, increase the population in the South Beach area. Patrons of the ballpark and employees would contribute to congestion if an emergency evacuation of

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*Derived from State EIR Guidelines, Appendix G, normally significant effect.

the area was required. An evacuation and emergency response plan will be developed and discussed in the EIR. The project's emergency plan would be coordinated with the City's emergency planning activities.

The increased activities on the site would not substantially increase the fire hazard at the site as the project would conform to the Life Safety provisions of the *San Francisco Building Code* and Title 24 of the *California Code of Regulations*. The project would replace buildings built prior to the enactment of these code requirements.

The historical land uses on the project site included the use of hazardous materials. The EIR will evaluate the potential for hazardous materials to be present in the soil at the project site, identify and characterize the nature and extent of hazardous materials and develop remediation strategies to mitigate public health hazards in accordance with regulatory requirements.

13. Cultural

	Yes	No	Discussed
*a. Disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community, ethnic or social group; or a paleontological site except as a part of a scientific study?	__	X	X
b. Conflict with established recreational, educational, religious or scientific uses of the area?	X	__	X
c. Conflict with the preservation of buildings subject to the provisions of Article 10 or (proposed) Article 11 of the City Planning Code?	__	X	X

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Historical Resources

A review of previous inventories and studies has been performed to determine the presence of historically or architecturally important properties on, or in the vicinity of, the proposed project site. The proposed ballpark site is located in an area of the city that is within close proximity to areas containing important historic resources.

Architectural surveys undertaken by the Foundation for San Francisco's Architectural Heritage in the project area have identified several properties as architecturally significant within 1,000 feet of the proposed ballpark site. Approximately eight of these structures are located within about one block of the project site.[1] These properties are: 178 Townsend Street; 180 Townsend Street; 115-131 Townsend Street (including the Southern Pacific Warehouse at 123 Townsend/126 King Streets); 135 Townsend Street; 128 King Street; the China Basin Building (on the China Basin Channel, between Second and Fourth Streets); the Lefty O'Doul Bridge (at Third Street); and, the Peter Maloney Bridge (at Fourth Street). The two bridges have been determined to be eligible for listing on the National Register of Historic Places. The properties at 128 King Street (Castle Brothers Warehouse) and at 123 Townsend Street (Southern Pacific Warehouse) are also determined eligible for the National Register. None of the aforementioned structures are situated on the project site. Most of the buildings identified are located within the South End Historic District, part of which is adjacent to the proposed ballpark site at approximately Second and King Streets.

Many of the buildings identified by the Heritage Foundation, particularly along Townsend Street, are former industrial and warehouse structures that have been converted to office or showroom uses. These buildings typically include brick work with decorative cornice and window details with masonry accents. The Lefty O'Doul and Peter Maloney bridges are both drawbridges built in the 1930s, with steel truss work and counterbalance structures.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The South End Historic District has been designated by the Board of Supervisors as having "a special character and special historical, architectural, and aesthetic interest and value and constitutes a distinct section of the city."[2]

A records search on the proposed project site was conducted by the Heritage Foundation in March, 1996.[3] The site is occupied mainly by warehouse and commercial-type structures, most dating from the 1930s and 1940s. None of the buildings have been determined eligible for the National Register of Historic Places. One of the buildings, 860 Second Street, has a Heritage Foundation rating of "C" (Contextual Importance, buildings that provide setting importance for more important buildings); however, their records search show a 1992 demolition permit for the building. Three other buildings, located at 40, 50 and 70 Berry Street, have a San Francisco Department of City Planning 1976 Architectural Survey rating of "3". The remainder of the buildings on the site have no Heritage Foundation or San Francisco Department of City Planning ratings.

A 1990 update to a 1983 Historic Property Survey Report completed for the City's Embarcadero Surface Roadway Project concluded that many buildings along Berry and King streets between Second and Third streets (including the buildings at 40, 50, and 70 Berry Street that have a Department of City Planning 1976 Architectural Survey rating of "3".[4] This area includes all of the ballpark project area west of Second Street. The update report also concluded that the district potentially was eligible for listing on the National Register of Historic Places on the basis of architectural and historical events-related criteria. A subsequent independent expert evaluation concluded that the district did not warrant consideration for the National Register. The City and the State Office of Historic Preservation subsequently formally declared that the proposed historic district is ineligible and does not meet National Register criteria because it lacks distinction as either a set of freight distribution buildings or as Art Deco architecture.[5] Therefore, none of the structures within the ballpark project area have architectural or historical significance.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

No buildings rated by the Heritage Foundation or structures determined to be eligible for the National Register in the surrounding vicinity would be discernibly affected by the construction of the ballpark. In that the one building on the site with a Heritage Foundation rating has already been granted a demolition permit, no Heritage-rated buildings would be eliminated by the ballpark. No portions of the South End Historical District would be encroached upon by any part of the proposed ballpark.

The Port of San Francisco is in the process of preparing a comprehensive plan for the preservation of historic resources between Pier 48 and Pier 45. The boundaries of the study are are discontiguous and do not include Pier 46B.[6]

The seawall to the north of the site has been identified as a structure of historical importance. The proposed project does not include any activities that would affect the historical integrity of the seawall.

Cultural Resources

A cultural resources evaluation was performed for the project site by David Chavez and Associates.[7] The results are summarized below. The project area was totally submerged below the waters of San Francisco Bay, between Mission Bay and South Beach Cove until the mid-nineteenth century, when it was gradually filled. Therefore, the potential for subsurface prehistoric archaeological deposits within the project area is very low , as is the potential for historic archaeological deposits from the Spanish period (1769-1822), Mexican era (1822-1848), and the Early American period (1848-1864).

As the project area was filled in, shipbuilding, boat repair, and lumber trade dominated the industrial activity of the area. A number of historical enterprises existed in the project area that include John G. North's shipyard (1854-1860), Patrick Henry Tiernan's shipyard (1856-

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

1858), San Francisco Gas Light Company (1864-1877)/Citizen Gas Company (1877-1887), Third Street Hay Wharf, Berry Street Lumber Wharf, and Second Street Wharf. John G. North's shipyard, Patrick Henry Tiernan's shipyard, other smaller shipbuilders, ship repair yards, wharves, and marine railways were historically located along King Street between Second and Third streets. Two previous archaeological investigations in this area were conducted in 1977 and in 1979. The 1977 investigation revealed the presence of "a light scatter of cultural materials which, for the most part,...dated to the years between 1875 and 1895", but did not contain enough evidence of "significant amounts of cultural materials."

In the 1979 investigation, a 20-foot long test trench was dug around the southwest corner of King and Third Streets. A redwood platform complete with wood support beams was uncovered approximately 8 feet below King Street. The redwood structure probably served as the subsurface foundation of a horse-powered capstan, which was used to haul ships out of the water along a marine railway to drydock. Because of the historical capstan's close proximity to the Third and King Streets corner of the project area, this section of the former Steamboat Point can be regarded as a sensitive location where additional significant archaeological resources could be discovered. Ballpark construction will take place in the southeast corner of King and Third Streets, and subsurface work will probably disturb the area. Therefore, the potential is high for impacting mid-nineteenth-century shipyard archaeological deposits, features and artifacts, which could meet CEQA criteria as significant resources. A mitigation is included as part of the project to address potential resources (see pp. 44-45).

The west side of Second Street between Townsend and Berry streets was occupied by the San Francisco Gas Light Company/Citizen Gas Company from 1864 to 1887, and by the Pope and Talbot Lumber Company during the first decade of the 1900s. A purifying house remaining from the gas company that fronted King Street was removed by 1919. The building was constructed without a basement and its foundation and remaining gas company debris appear to have been removed during 1930s construction of warehouse and industrial

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

buildings at the east end of the block. Ballpark construction will disturb this area, but because the historical record suggests a low possibility of recovering gas company remnants, the potential for impacts to resources is low.

Three other historical resources in the project site vicinity are the Third Street Hay Wharf (1880s - 1920s), the Berry Street Lumber Wharf (1880s - 1920s), and the Second Street Wharf (1900 - 1920s). The Third Street Hay Wharf extends below the current-standing Pier 46B, which was constructed on caissons during the early 1920s "over the water of San Francisco Bay." The majority of the Hay Wharf decking and features were likely removed prior to or destroyed during sinking of the caissons and subsequent construction of the pier. It is possible that some of the Hay Wharf pilings may still be present either in the water and/or in fill. However it is highly unlikely that such piling remnants would meet CEQA criteria as significant resources. Therefore, ballpark construction would have a low potential for impacting significant resources.

The Berry Street Lumber Wharf extended down the Bérry Street alignment as well as through the eastern section of the block bounded by Third, Berry, and Second streets and China Basin, and the Second Street Wharf extended into the project area along Berry Street at the foot of Second Street. For reasons similar to those presented for the Third Street Wharf, the Berry Street Lumber Wharf and the Second Street Wharf are believed to be locations with a low possibility for the survival of wharf remains, and with low potential for impacting significant resources.

While a generalized potential exists for maritime resources, no specific locations are established for the project area where known historical ship and boat remains may be found. Thus, no pre-construction investigations or archaeological exploration is warranted since little potential exists for such resources to be encountered. If maritime resources are discovered during construction the mitigation measures discussed below would be implemented.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Recreational

The proposed ballpark site is near South Beach Park and South Beach Harbor. The site is adjacent to the proposed Redevelopment Agency extension of South Beach Park. The potential impacts to uses of these recreational areas will be discussed in the EIR with regard to Land Use, Noise, and Transportation/Circulation.

NOTES: Cultural

1. City and County of San Francisco, Department of City Planning, *Mission Bay Final Environmental Impact Report*, SCH No. 86070113, August 23, 1990.

2. San Francisco Planning Code. Appendix 1 to Article 10, South End Historic District.

3. Records Search. The Foundation for San Francisco's Architectural Heritage, conducted March 22, 1996.

4. Bloomfield, Anne, *A Partial Update to Historic Architectural Survey Report of 1983 for 4-SF-I-280 Transfer Concept*, prepared for City and County of San Francisco, Department of Public Works, August 1990.

5. a) Kathryn Gualtieri, State Historic Preservation Officer, Office of Historic Preservation, letter to Bruce E. Cannon, Division Administrator, Federal Highway Administration, re: Embarcadero Roadway, San Francisco, IXD-280-1(865), October 22, 1990.

   b) Paul Groth, Associate Professor, University of California, Berkeley, letter to Joe Cheung, Project Manager, San Francisco Department of Public Works, re: Evaluation of the Historic Preservation District Proposal for the Berry and King Street Freight Distribution District, August 8, 1990.

   c) Dean L. Macris, Director of Planning, Department of City Planning, City and County of San Francisco, letter to Richard Evans, Director of Department of Public Works, re: A Partial Update to Historical Architectural Survey Report of 1983 for 4-SF-I-280 Transfer Concept, August 3, 1990.

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*Derived from State EIR Guidelines, Appendix G, normally significant effect.

d) Bloomfield, Anne, *A Partial Update to Historic Architectural Survey Report of 1983 for 4-SF-I-280 Transfer Concept*, prepared for City and County of San Francisco, Department of Public Works, August 1990.

6. Kari Kilstrom, Planner, Port of San Francisco, memorandum, February 21, 1997.

7. David Chavez & Associates, *Archaeological Resources Assessment for Pacific Bell Park at China Basin, San Francisco*, California, September 1996.

C. OTHER	Yes	No	Discussed
Require approval of permits from City Departments other than Department of City Planning or Bureau of Building Inspection or from Regional, State or Federal Agencies?	X		

The following project approvals required will be discussed in the EIR:

- Planning Commission: certification of EIR and adoption of mitigation monitoring program; General Plan amendments; determination of General Plan consistency of Redevelopment Plan amendment and street vacations; and Conditional Use Authorization.

- Port Commission: acquisition of Caltrans parcel; street vacations; ground lease and Public Trust/Burton Act findings; Waterfront Land Use Plan amendment; consistency with Waterfront Land Use Plan.

- Redevelopment Commission: possible joint certification of Draft EIR with City Planning Commission; Redevelopment Plan amendment; ground lease; Disposition and Development Agreement.

- Board of Supervisors: acquisition of Caltrans parcel; street vacations; ground lease; Redevelopment Plan amendment; General Plan amendments.

- California Transportation Commission: sale of Caltrans parcel.

- RWQCB: remediation plans.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

- SLC: ground lease.
- BCDC: Major Permit.
- Department of Public Works: Parcel Map Approval.

D. MITIGATION MEASURES	Yes	No	N/A	Discussed
1. If any significant effects have been identified, are there ways to mitigate them?	X	—	—	—
2. Are all mitigation measures identified above included in the project?	X	—	—	—

The following are mitigation measures related to topics determined to require no further analysis in the EIR. These measures are agreed to by the project sponsor and have become part of the project. The EIR will contain a mitigation chapter describing these measures and also include other measures which would be, or could be, adopted to reduce potential adverse effects of the project identified in the EIR.

1. Prepare and implement a Construction Storm Water Pollution Prevention Plan using at least the following Best Management Practices for controlling stormwater quality on-site.

   - Schedule as much of the excavation as possible for the dry season.
   - Minimize the area and length of time during which the site is cleared and graded.
   - Prevent the release of construction activity pollutants such as cement, mortar, paints and solvents, fuel and lubricating oils, pesticides and herbicides.
   - Install filter fences or straw bales to slow runoff and remove sediments.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

- Plant grass or cover soil stockpiles with stabilizing coatings or plastic sheeting to minimize erosion.
- Install and maintain sediment and grease traps in local stormwater intakes during the construction period.
- Clean wheels and cover loads of trucks carrying excavated soils before they leave the construction site.
- Implement a hazardous material spill prevention, control and cleanup program for the construction period.

2. One area with a high potential for impacts to significant resources has been identified at the southeast corner of Third and King Streets. Four locations (San Francisco Gas Light Company/Citizen Gas Company; Third Street Hay Wharf; Berry Street Lumber Wharf; and Second Street Wharf have been identified with relatively low potentials for impacts to significant resources. Nevertheless, there is some possibility that historic archaeological resources could be encountered at those locations.

   Given the location and depth of excavation proposed, and the likelihood that archaeological resources would be encountered on the project site, the sponsor has agreed to retain the services of an archaeologist. The archaeologist would carry out a pre-excavation testing program to better determine the probability of finding cultural and historical remains. The testing program would use a series of mechanical, exploratory borings or trenches and/or other testing methods determined by the archaeologist to be appropriate.

   If, after testing, the archaeologist determines that no further investigations or precautions are necessary to safeguard potentially significant archaeological resources, the archaeologist would submit a written report to the Environmental Review Officer (ERO), with a copy to the project sponsor. If the archaeologist determines that further investigations or precautions are necessary, he/she shall consult with the ERO and they shall jointly determine what additional procedures are necessary to minimize potential effects on archaeological resources.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

These additional mitigation measures would be implemented by the project sponsor and might include a program of on-site monitoring of all site excavation, during which the archaeologist would record observations in a permanent log. The monitoring program, whether or not there are finds of significance, would result in a written report to be submitted first and directly to the ERO, with a copy to the project sponsor. During the monitoring program, the project sponsor would designate one individual on site as his/her representative. This representative would have the authority to suspend work at the site to give the archaeologist time to investigate and evaluate archaeological resources should they be encountered.

Should evidence of cultural resources of potential significance be found during the monitoring program, the archaeologist would immediately notify the Environmental Review Officer (ERO), and the project sponsor would halt any activities which the archaeologist and the ERO jointly determine could damage such cultural resources. Ground-disturbing activities which might damage cultural resources would be suspended for a total maximum of four weeks over the course of construction.

After notifying the ERO, the archaeologist would prepare a written report to be submitted first and directly to the ERO, with a copy to the project sponsor, which would contain an assessment of the potential significance of the find and recommendations for what measure should be implemented to minimize potential effects on archaeological resources. Based on this report, the ERO would recommend specific additional mitigation measures to be implemented by the project sponsor. These additional mitigation measures might include a site security program, additional on-site investigations by the archaeologist, and/or documentation, preservation, and recovery of cultural material.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Finally, the archaeologist would prepare a report documenting the cultural resources that were discovered, an evaluation as to their significance, and a description as to how any archaeological testing, exploration and/or recovery program was conducted.

Copies of all draft reports prepared according to this mitigation measure would be sent first and directly to the ERO for review. Following approval by the ERO, copies of the final report(s) would be sent by the archaeologist directly to the President of the Landmarks Preservation Advisory Board and the California Archaeological Site Survey Northwest Information Center. Three copies of the final archaeology report(s) shall be submitted to the Office of Environmental Review, accompanied by copies of the transmittals documenting its distribution to the President of the Landmarks Preservation Advisory Board and the California Archaeological Site Survey Northwest Information Center.

No specific locations of archaeological sensitivity are identified; however, ship and boat remains could be buried almost anywhere in the project area. Because of this sensitivity, locations where construction excavation would take place, that otherwise are not subject to archaeological investigation, would be subject to archaeological monitoring.

E. ALTERNATIVES

Alternatives to the proposed project will be discussed in the EIR.

1. No Project Alternative (as required by CEQA)
2. Reduced Project - Retain Ballpark Without Commercial Facilities Not Directly Related to the Ballpark Alternative

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

3. Alternate Provision of Parking Alternative

4. Alternate Sites Considered and Rejected.

F. MANDATORY FINDINGS OF SIGNIFICANCE	Yes	No	Discussed
*1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?	_	X	_
*2. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	_	X	_
*3. Does the project have possible environmental effects which are individually limited, but cumulatively considerable? (Analyze in the light of past projects, other current projects, and probable future projects.)	X	_	_
*4. Would the project cause substantial adverse effects on human beings, either directly or indirectly?	X	_	_

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

G. ON THE BASIS OF THIS INITIAL STUDY:

___ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Department of City Planning.

___ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because the mitigation measures, numbers __, in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.

_X_ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

BARBARA W. SAHM
Environmental
Review Officer

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

B. WIND

WIND STUDY METHODOLOGY AND RESULTS

This summary of wind study methodology is based on a technical report prepared jointly by Charles Bennett, Environmental Science Associates, and Bruce R. White, Ph.D., Professor of Mechanical Engineering at the University of California, Davis. The study is independent of the University. The report is available for review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

Introduction and Overview

A wind-tunnel test was performed for the ballpark, proposed to be located on the block bounded by Third Street, King Street, the South Beach Marina Park and San Francisco Bay, in order to define the pedestrian wind environment that would exist around the proposed ballpark project. For purposes of the EIR analyses and discussion, pedestrian-level wind speeds were measured or calculated at selected points for the site: 1) as it presently exists; 2) with the proposed Project; 3) with the proposed Project and potential future Cumulative Development; and 4) Reduced Project Alternative.

Wind analysis was not performed inside the ballpark in the seating areas for the report. The ballpark seating area has been oriented to reduce winds in seating areas based on previous studies.

Details of the background and test methods are presented in the subsection entitled Background, and test results and discussion are presented in the subsection entitled Study Results. A brief summary of the test results and conclusions follows.

Case 1: Existing Setting

Existing wind speeds at 39 of the 46 measured locations exceed the pedestrian-comfort criterion value of 11 mph, while wind speeds were 18 mph or 19 mph at 12 of those 46 locations.

The wind hazard criterion is exceeded at two of the 46 existing locations. The total duration of the exceedances would be about 18 hours.

Case 2: Project plus Existing Setting

The project would reduce wind speeds at 30 of the 46 existing locations. The average wind speed at the 46 locations would be reduced by more than 2 mph. In addition to the existing setting locations, 23 project-specific test locations were added within and adjacent to the project. The pedestrian comfort criterion would be exceeded at 50 of the total of 69 locations.

The wind hazard exceedances at the two existing setting locations would be eliminated, but the hazard criterion would be exceeded at two locations within the project. The total duration of the exceedances would be about 90 hours.

Case 3: Project plus Cumulative Development[1]

The Project plus Cumulative Development scenario would be expected to result in wind speed reductions of about 1 mph. It is estimated that the pedestrian comfort criterion exceedances with the Project scenario (at two locations) would be reduced by about 15, to approximately 35 with the Project plus Cumulative Development scenario. The Cumulative Development scenario would be expected to reduce or eliminate the exceedance of the wind

hazard criterion, probably bringing the total to one or two locations within the ballpark and decreasing the total hours of exceedances substantially.

Case 4: Reduced Project Alternative plus Existing Setting

The Reduced Project Alternative would reduce the average wind speed by much less than 1 mph, compared with wind effects of the project. Changes would occur only in areas very close to Third Street; in general, wind speeds within the concourse immediately inside the ballpark would be reduced and wind speeds outside the ballpark along the Third Street frontage would be increased. The Reduced Project Alternative would eliminate five pedestrian wind comfort criterion exceedances and add two exceedances, for a net total of 47 exceedances out of 68 pedestrian test locations.

With the Reduced Project Alternative, the wind hazard criterion would be exceeded at three locations. The Reduced Project Alternative would add two new wind hazard exceedances at locations outside the ballpark and would decrease the hours duration of one of the hazard exceedance locations within the ballpark with the project. Overall, the total exceedances would be about 37 hours.

Mitigation of Winds from the Project

The wind hazard criterion exceedances projected to occur within the proposed ballpark itself appear to be amenable to mitigation by the use of on-site structures, such as screens, arbors and/or trellises. It is reasonable to expect that such structures could be designed and constructed to eliminate those adverse wind conditions.

Wind-tunnel measurements demonstrated that wind speed reductions of 1 mph to 11 mph would occur at locations along the project's King and Third Street frontages and in the South

Beach Park area if mature-sized landscape trees were present at spacings of approximately 40 ft., center-to-center. Those reductions would improve the general pedestrian wind environment along the project frontage sidewalks and in South Beach Park.

Test 3, the Cumulative Development scenario, results suggest that substantial reduction in the total hours of exceedance of the hazard criterion resulting from the project would occur with development of the area bounded by Third Street, Townsend Street, Seventh Street and Berry Street. The development to the west and southwest also would be expected to help reduce the number of locations and hours of duration of remaining hazard locations.

Background

Existing Climate and Wind Conditions

Average winds speeds in San Francisco are the highest in the summer and lowest in winter. However, the strongest peak winds occur in winter. The highest average wind speeds occur in mid-afternoon and the lowest in the early morning. Westerly to northwesterly winds are the most frequent and strongest winds during all seasons. Of the 16 primary wind directions, four have the greatest frequency of occurrence as well as they make up the majority of the strong winds that occur; these are northwest, west-northwest, west and west-southwest winds.

Data describing the speed, direction, and frequency of occurrence of winds were gathered at the old San Francisco Federal Building at 50 United Nations Plaza (at a height of 132 feet [ft.]) during the six-year period, 1945 to 1950. Measurements taken hourly and averaged over one-minute periods have been tabulated for each month (averaged over the six years) in three-hour periods using 7 classes of wind speed and 16 compass directions. Analysis of these data shows that during the hours from 6:00 a.m. to 8:00 p.m., about 70 percent of all winds blow from 5 of the 16 directions, as follows: Northwest (NW), 10 percent; West

Northwest (WNW), 14 percent; West (W), 35 percent; West Southwest (WSW), 2 percent; Southwest (SW), 9 percent; and all other winds, 28 percent. Calm conditions occur 2 percent of the time. More than 90 percent of measured winds over 13 mph blow from the NW, WNW, W, WSW, or SW.

Wind Speed and Pedestrian Comfort

The comfort of pedestrians varies under different conditions of sun exposure, temperature, clothing, and wind speed. Winds up to four miles per hour (mph) have no noticeable effect on pedestrian comfort. With winds from 4 to 8 mph, wind is felt on the face. Winds from 8 to 13 mph will disturb hair, cause clothing to flap, and extend a light flag mounted on a pole. Winds from 13 to 19 mph will raise loose paper, dust and dry soil, and will disarrange hair. For winds from 19 to 26 mph, the force of the wind will be felt on the body. With 26 to 34 mph winds, umbrellas are used with difficulty, hair is blown straight, there is difficulty in walking steadily, and wind noise is unpleasant. Winds over 34 mph increase difficulty with balance and gusts can blow people over.[2]

City Planning Code Requirements

City Planning Code Section 148, Reduction of Ground-Level Wind Currents in C-3 (Downtown Commercial) Districts, requires buildings to be shaped so as not to cause ground-level wind currents to exceed, more than 10 percent of the time, 11 mph in substantial pedestrian use areas, and 7 mph in public seating areas. Similarly, the Code requires that buildings not cause equivalent wind speeds to reach or exceed the hazard level of 26 mph for a single full hour of the year, or 0.011416 percent of the time. The comfort criteria are based on wind speeds that are measured for one minute and averaged. In contrast, the hazard criterion is based on winds that are measured for one hour and averaged; when stated on the same basis as the comfort criteria winds, the hazard criterion speed is a

one-minute average of 36 mph. The wind ordinance is defined in terms of equivalent wind speed. This term denotes an average wind speed (mean velocity), adjusted to include the level of gustiness and turbulence.[3]

The proposed ballpark site is not located within a zoning district for which the City Planning Code has established wind speed criteria. For purposes of analysis, this EIR uses the criteria established for the C-3 District, and the Project is examined in relation to the 11 mph pedestrian comfort criterion and the hazard criterion of the Code.

Wind Speed Profile Adjustments and the Section 148 Methodology

The Section 148 wind test methodology implicitly assumes that the relationship between height above the ground and wind speed (referred to hereafter as the wind speed profile) is the same in the test area as at the Civic Center weather station. However, wind speed profiles vary from place to place, and the wind speed profile for the project site appears to differ from than at the Civic Center weather station where the wind data were gathered. The overall result is that the Section 148 methodology is conservative for this EIR analysis in that it reports worst-case results (namely, higher ground-level wind speeds) than would be expected to occur at and near the project site. The wind speeds reported below in the subsection entitled Study Results, reflect the use of the adjusted factors resulting from the wind profile measurements.

As a supplement to the wind-tunnel tests, wind-tunnel measurements of the wind speed profiles for NW, WNW, W and WSW winds were made for the project site and for Civic Center locations. Wind profile adjustment factors were estimated for those wind directions, based on those profile measurements and upon the methodology presented in the ASHRAE Handbook, Chapter 14. Based on data from the wind speed profiles, the ASHRAE methodology was modified to create two intermediate categories to add to the four presented in Chapter 14. Those categories were assigned for each of the four wind directions at the

Old Federal Building meteorological station and for each of the four wind directions at the project site. The assignment provided the values used for alpha and delta, the power law exponent and the boundary layer thickness, respectively, and ultimately the factors for normalizing the meteorological data to the wind speed at the project site. The normalizing factors used for each wind direction are: NW and WNW winds, 1.933; W wind, 1.716; and, WSW wind, 1.558. These differ from the Section 148 method which uses a single factor of 2.000 for each direction. Use of factors other than 2.000 would alter the predicted wind speed in proportion to the ratio of (factor/2), so the NW and WNW wind speeds are reduced by about 3 percent, W wind speeds by 14 percent and WSW wind speeds reduced by 22 percent.

Methodology and Assumptions

A 1-inch equals 50-feet scale model of the project site and surrounding several blocks was constructed in order to simulate the project and its existing context. The scale model of the project and surrounding area was provided by ESA. The prior project design and current project design used were from the Schematic Design Plans, dated June 1996 and July 15, 1996, and plans updated in December 1996, as provided by HOK Sports, Inc. Information on potential building massing to represent cumulative development in the Mission Bay development between China Basin, Third Street, Seventh Street and Townsend Street, was provided by EIP Associates and modeled by ESA. The scale models were tested in a Boundary Layer wind-tunnel at the University of California, Davis, under the direction of Dr. Bruce White. These tests, however, were performed independent of the University.

The models were tested in a wind tunnel that allows testing of natural atmospheric boundary layer flow past surface objects such as buildings and other structures. The tunnel has an overall length of 22 meters (m) (72 ft.), a test section of 1.22 m (4 ft.) wide by 1.83 m (6 ft.) high, and an adjustable false ceiling. The adjustable ceiling and turbulence generators

allow speeds within the tunnel to vary from one to eight meters per second (m/s), or 2.2 to 17.9 mph.

Wind-tunnel tests were conducted for the following configurations: the setting in its existing condition; the current project design in the existing setting; and the Reduced Project Alternative in the existing setting. A prior design was tested both with and without cumulative development. The latter test was used to identify effects of the Project plus Cumulative Development (see Endnote 1, below). In accordance with the protocol for wind-tunnel testing in Section 148 of the City Planning Code, each of these four configurations was wind-tunnel tested for each of four wind directions: northwest (NW), west-northwest (WNW), west (W) and west-southwest (WSW). The results of the tests for the project, prior design, and prior design with cumulative development are presented in Table X.B.1 and X.B.2. Wind testing results for the project, and for the Reduced Project Alternative, under existing conditions and with cumulative development are presented in Table X.B.4.

Wind-speed measurements were made with a hot-wire anemometer, an instrument that directly relates rates of heat transfer to wind speeds by electronic signals. The hot-wire signals are proportional to the magnitude and steadiness of the wind. By measuring both the mean wind speeds and corresponding turbulence intensities, high wind speeds and gustiness (changes in wind speeds over short periods of time) could be detected. The ratio of near-surface speed to reference wind speed was calculated from the hot-wire measurements. The inherent uncertainty of measurements made with the hot-wire anemometer close to the surface of the model is plus or minus 5 percent of the true values.

Each wind-tunnel measurement results in a ratio that relates the speed of ground-level wind to the speed at the reference elevation, in this case the height of the Old San Francisco Federal Building. The frequency with which a particular wind velocity is exceeded at any test location is then calculated by using the measured wind-tunnel ratio and a specified ground speed to determine the corresponding reference wind speed for each direction. In

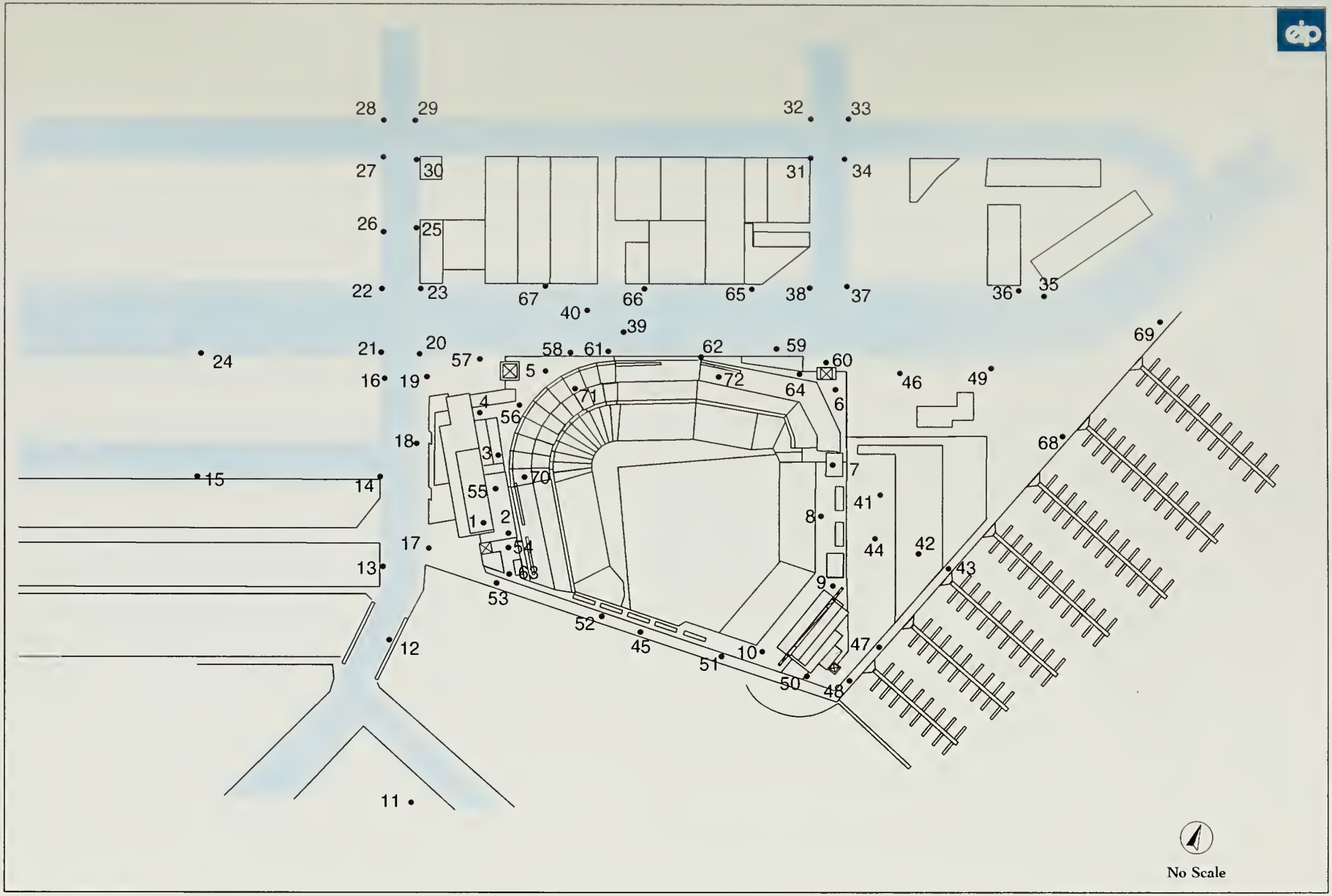
general, this gives different reference speeds for each major directional component of the wind. The wind data for San Francisco are then used to calculate the percentage of the time that the specific ground-level wind speed is exceeded for each directional component. The sum of these is the total percentage of time that the specified ground-level wind speed is exceeded. A computer is used to calculate the total percentages for a series of wind speeds until the speed exceeded ten percent of the time is found, for each location.

The mean wind speeds are compared to the comfort criterion of 11 mph for pedestrian areas, not to be exceeded more than 10 percent of the time. Separate calculations evaluate compliance with the hazard criterion. The wind data observed at the Old San Francisco Federal Building are not full hour average speeds as specified by the Code, so it is necessary to adjust the equivalent speeds to obtain the hourly average of 26 mph.[4] The adjusted equivalent wind speeds are used to calculate compliance with the hazard criterion.

Study Results

Introduction

The test locations at which the measurements were made are shown in Figure X.B.1. Forty-six test locations were studied for the four configurations for four prevailing wind directions: northwesterly, west-northwesterly, westerly, and southwesterly (west-southwesterly winds are accounted for in the analysis of southwesterly winds). To the extent that the comparable points exist, all hot-wire measurements were taken at the same series of surface points around the project site for all test configurations and wind directions testing. These 46 locations are common to all configurations; additional points are tested for other test configurations, as appropriate. None of the test locations correspond to representative potential outdoor seating locations; all accessible test locations, including those in South Beach Park, are considered to be walking and activity, rather than sitting, areas.



SOURCE: Environmental Science Associates

GIANTS BALLPARK

Figure X.B.1 Wind Test Point Location Plan

Wind Evaluation and Criteria

The performance requirements of City Planning Code Section 148 were used to evaluate the results of the tests.

The mean wind speeds are compared to the comfort criteria of 11 mph for pedestrian areas, which is not to be exceeded more than 10 percent of the time. Separate calculations evaluate compliance with the hazard criterion. As previously noted, the wind data observed at the Old San Francisco Federal Building are not full hour average speeds as identified by the City Planning Code, so it was necessary to adjust the wind criterion speed to obtain a valid comparison with the available data and the equivalent wind speeds based on those data. When normalized to the equivalent wind speeds used here, the hazard criterion speed is equal to 36 mph, the value used in the wind hazard analysis. Throughout the following discussion the wind speeds reported refer to the equivalent wind speeds that would be exceeded 10 percent of the time when referring to the comfort criteria, and one hour per year when referring to the hazard criterion.

Test Output

The outputs of the computer program are presented in two sets of tables, one for normal winds and one for hazardous winds. These tables, adapted from those appended to the original Memorandum on file at the Planning Department, provide the detail of the data and the intermediate results described above. The wind-tunnel ratios were included in the program input, and the results evaluated in the discussions that follow. Summary information about the wind-tunnel test results are presented in Tables X.B.1 and X.B.2, Pedestrian Comfort Analysis and Wind Hazard Analysis, respectively.

TABLE X.B.1
PEDESTRIAN COMFORT ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
1	11				25	59		x	22	47	-3	x	22	45	-3	x
2	11				19	40		x	12	14	-7	x	13	18	-6	x
3	11				20	44		x	10	7	-10	-	11	10	-9	-
4	11				23	56		x	15	28	-8	x	15	25	-9	x
5	11				14	27		x	15	26	1	x	14	19		x
6	11				12	14		x	10	7	-2	-	9	6	-3	-
7	11				9	5			9	5			9	4		
8	11				11	12			9	3	-2		9	3	-2	
9	11				12	14		x	12	14		x	12	14	1	x
10	11				16	31		x	16	31		x	17	32	1	x
11	11	18	37	e	17	33	-1	e	17	33		e	15	27	-1	e
12	11	6	0		6	0	0		6	0	-1		5	0	-1	
13	11	7	0		7	1	0		6	1			7	0		
14	11	17	32	e	11	13	-6	-	16	28	5	#	13	14	2	#
15	11	13	17	e	12	15	-1	e	12	15		e	9	2	-4	-
16	11	18	37	e	11	17	-6	-	15	25	3	#	12	11		#
17	11				17	36		x	18	32	1	x	15	24	-2	x
18	11	18	37	e	15	29	-3	e	15	25		e	10	7	-5	-
19	11				14	26		x	13	18	-1	x	11	10	-3	-
20	11	18	37	e	19	41	1	e	14	22	-5	e	10	8	-8	-
21	11	18	38	e	19	45	1	e	15	28	-3	e	10	7	-9	-
22	11	18	38	e	12	16	-6	e	16	30	5	e	9	6	-2	-
23	11	18	39	e	16	34	-2	e	15	26	-1	e	9	3	-7	-
24	11	18	38	e	17	33	-1	e	17	33		e	14	22	-2	e
25	11	13	19	e	12	16	-1	e	12	16		e	13	13	1	e
26	11	16	32	e	15	26	-1	e	15	26		e	9	5	-6	-

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.1
PEDESTRIAN COMFORT ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
27	11	14	22	e	13	19	-1	e	13	19		e	17	34	5	e
28	11	12	12	e	11	10	-1	-	11	10			11	12		
29	11	14	21	e	14	21	0	e	14	21		e	15	26	1	e
30	11	13	20	e	13	18	-1	e	13	18		e	15	25	3	e
31	11	13	20	e	13	21	0	e	13	21		e	13	20		e
32	11	9	4		8	2	-1		8	2			8	2		
33	11	15	26	e	14	22	-1	e	14	22		e	13	19	-1	e
34	11	14	23	e	14	21	-1	e	14	21		e	12	12	-2	e
35	11	5	0		6	0	0		6	0			6	0		
36	11	16	28	e	16	27	0	e	16	27		e	15	24	-1	e
37	11	15	25	e	13	21	-1	e	13	21		e	13	19		e
38	11	11	11		12	14	0	+	12	14		+	10	6	-2	-
39	11	15	24	e	14	22	-1	e	14	22		e	12	13	-2	e
40	11	14	19	e	14	21	0	e	14	21		e	11	10	-3	-
41	11	19	40	e	15	18	-3	e	15	18		e	15	19		e
42	11	18	38	e	15	17	-3	e	15	17		e	15	16	-1	e
43	11	18	37	e	15	17	-3	e	15	17		e	15	16		e
44	11	19	41	e	13	13	-6	e	13	13		e	13	14		e
45	11				8	3			8	3	1		10	7	2	
46	11	16	29	e	17	30	1	e	17	30		e	16	28	-1	e
47	11	16	23	e	9	5	-7	-	9	5			8	2	-1	
48	11				8	3			8	3			7	2		
49	11	16	31	e	16	31	0	e	16	31		e	16	28	-1	e
50	11				10	7			10	7			10	7		
51	11				9	5			11	9	2		11	9	2	
52	11				8	1			8	1			10	7	2	

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.1
PEDESTRIAN COMFORT ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
53	11				15	27		x	8	2	-6	-	9	3	-5	-
54	11				10	11			13	17	3	#	13	16	3	#
55	11				14	26		x	12	13	-2	x	11	10	-3	-
56	11				13	21		x	6	0	-7	-	7	0	-6	-
57	11	18	42	e	14	27	-4	e	13	17	-1	e	9	5	-5	-
58	11	17	33	e	10	8	-7	-	12	16	3	#	10	7	1	
59	11	15	30	e	14	27	-2	e	14	22		e	12	15	-2	e
60	11	17	34	e	12	21	-4	e	13	18		e	13	19	1	e
61	11	15	27	e	14	20	-2	e	14	20		e	11	8	-3	-
62	11	15	26	e	13	18	-2	e	13	18		e	11	12	-2	-
63	11				18	37		x	14	21	-4	x	14	23	-4	x
64	11				13	23		x	17	32	4	x	13	15		x
65	11	9	3		12	15	3	+	12	15		+	12	12		+
66	11	15	24	e	11	10	-4	-	11	10			11	11		
67	11	9	4		9	4	0		9	4			8	2	-1	
68	11	17	30	e	17	30	0	e	17	30		e	16	28		e
69	11	13	18	e	12	17	0	e	12	17		e	12	13	-1	e
Averages and Changes, Total		**15**	**25**		**12**	**19**	**-1**		**13**	**17**	**-0**		**12**	**9**	**-1**	
70	n/a				31	68			35	73	4		29	64	-2	
71	n/a				34	68			38	72	4		31	66	-3	
72	n/a				25	56			29	62	4		26	57	1	

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

Source: Environmental Science Associates, 1997

TABLE X.B.2
WIND HAZARD ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Wind Hazard Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Existing	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds
1	36				46	67		x	47	50	-17	x	41	14	-53	x
2	36				33				24				27			
3	36				34				18				23			
4	36				41	23		x	33		-23	-	33		-23	-
5	36				27				32				34			
6	36				25				21				21			
7	36				23				23				23			
8	36				21				17				16			
9	36				22				22				22			
10	36				33				33				35			
11	36	33			29				29				28			
12	36	16			14				11				10			
13	36	18			18				15				14			
14	36	31			29				32				27			
15	36	26			22				22				15			
16	36	34			34				30				26			
17	36				35				37	2	2	#	29			
18	36	33			29				32				23			
19	36				26				26				27			
20	36	33			32				25				20			
21	36	35			35				30				18			
22	36	34			29				31				24			
23	36	35			30				29				21			
24	36	31			31				31				25			
25	36	25			21				21				32			
26	36	31			29				29				24			
27	36	25			24				24				33			
28	36	26			25				25				22			
29	36	30			29				29				30			
30	36	30			28				28				29			

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.2
WIND HAZARD ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Wind Hazard Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Existing	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds
31	36	23			22				22				22			
32	36	21			18				18				17			
33	36	26			24				24				24			
34	36	25			24				24				25			
35	36	10			12				12				10			
36	36	37	2	e	36		-2	-	36				35			
37	36	29			24				24				26			
38	36	26			25				25				20			
39	36	29			26				26				27			
40	36	27			28				28				24			
41	36	35			35				35				34			
42	36	35			34				34				33			
43	36	34			34				34				34			
44	36	35			34				34				33			
45	36				21				18				20			
46	36	31			33				33				30			
47	36	41	15	e	21		-15	-	21				17			
48	36				20				20				19			
49	36	29			31				31				29			
50	36				22				22				20			
51	36				21				21				26			
52	36				21				21				21			
53	36				26				15				16			
54	36				19				27				28			
55	36				24				27				25			
56	36				29				13				12			
57	36	33			25				22				19			
58	36	29			18				21				20			
59	36	28			24				24				23			
60	36	31			22				27				24			

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.2
WIND HAZARD ANALYSIS FOR THE PROJECT
Wind Test, August 1996 and January 1997

References		Existing Conditions			Current Project Design				Prior Design				Prior Design with Cumulative Development			
Location Number	Wind Hazard Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Existing	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds	Measured Equivalent Wind Speed (mph)	Hours per year Wind Exceeds Criterion Speed	Hours Change Relative to Project	Exceeds
61	36	27			24				24				20			
62	36	31			23				23				21			
63	36				31				28				29			
64	36				24				31				25			
65	36	26			25				25				30			
66	36	34			24				24				19			
67	36	24			26				26				19			
68	36	34			33				33				36			
69	36	27			26				26				25			
Durations and Changes, Totals:			**18**			**90**	**-18**			**52**	**-38**			**14**	**-76**	

Key e Existing winds exceed Criterion speed one full hour per year or more.

Key x New, Project-specific
\+ New, changes existing.
\- Eliminates existing.

Key # New, due to Alternative
e/x/+ Previous
\- Eliminates previous.

Key # New, due to Cumulative
e/x/+ Previous
\- Eliminates previous.

Source: Environmental Science Associates, 1997.

Discussion

Previous wind-tunnel testing, wind data gathering efforts and anecdotal information on wind conditions have indicated that high wind speeds occur along King and Berry Streets in the vicinity of the project. The analysis for this report modeled sidewalk wind speed locations both well upwind and well downwind of the project in order to correctly assess the magnitude and the extent of the influence of the project on the local wind environment.

Test 1 - The Existing Setting

Comfort Conditions at Basic Locations

Wind speeds were measured at 46 locations to characterize the existing conditions at the site and vicinity. Test locations 1 through 10, 17, 19, 45, 48, 50 through 56, 63, 64, 70, 71 and 72 relate to elements of the project and therefore have no meaning for the existing setting. Existing wind speeds at 39 of the 46 measured locations exceed the 11-mph pedestrian-comfort criterion. Wind speeds are 11 mph or less at 7 of the 46 locations, while wind speeds are 18 mph or 19 mph at 12 locations.

South of China Basin, the wind speed in the center of the parking area (location #11) is about 18 mph. Along Third Street on the Lefty O'Doul Bridge (#12) and adjacent to the China Basin Building (#13), wind speeds are 6 mph and 7 mph, respectively. At two locations on Berry Street (#14, 15), wind speeds are 17 mph and 13 mph. Moving northerly along Third Street, wind speeds mid-block on Third (#16, 18) between King and Berry Streets and at all corners of the intersection of Third and King Streets (#20, 21, 22, 23) are all 18 mph. More northerly along Third Street, winds mid-block (#25, 26) between King and Townsend Streets are 13 mph and 16 mph, and winds at the intersection (#27, 28, 29, 30) of Third and Townsend Streets range from 12 mph to 14 mph. Two of these 17 locations meet the pedestrian comfort criterion.

At the intersection (#37, 38, 46, 60) of Second Street and King Street, wind speeds range from 11 mph to 17 mph. Moving northerly along Second Street, winds at the intersection (#31, 32, 33, 34) of Second Street and Townsend Street range from 9 mph to 15 mph. Two of these eight locations meet the comfort criterion.

Wind speeds on King Street are 18 mph mid-block (#24) between Fourth and Third Streets, range from 9 mph to 17 mph mid block (#39, 40, 58, 59, 61, 62, 65, 66, 67) between Third and Second Streets, 5 mph to 16 mph mid-block (#35, 36, 49) between Second Street and The Embarcadero, and 13 mph at The Embarcadero near Pier 40 (#69). Three of these 13 locations meet the comfort criterion.

Wind speeds in the vicinity of South Beach Park (#41, 42, 43, 44, 47) range from 16 mph to 19 mph, with wind speeds of 17 mph adjacent to the South Beach Harbor (#68).

The wind conditions in the vicinity of the site may be attributed to the open nature of the area and resulting lack of wind protection provided by the larger buildings and trees of the Downtown area.

Hazard Conditions

The wind hazard criterion currently is exceeded at 2 of the 46 locations. The total duration of the exceedances is about 18 hours per year. One hazard condition occurs on King Street, mid-block between Second Street and The Embarcadero (#36 - 2 hours). The other hazard exceedance occurs at the south end of South Beach Park (#47 - 15 hours).

Test 2 - The Project plus the Existing Setting

Comfort Conditions

Wind speeds in general would be reduced by the project, which would reduce existing wind speeds at 30 of the original 46 basic locations. The average wind speed at all locations would be more than 2 mph lower than the average wind speed for all existing 46 basic (setting) locations. With the project conditions, the pedestrian wind criterion would be exceeded at 50 of the total of 69 locations measured.

Comfort Conditions at Basic Locations

The project would add two new pedestrian wind criterion exceedances (#65, 38) and would eliminate six existing exceedances (#14, 16, 28, 47, 58, 66), for a net total of 35 out of the 46 basic locations. The project would reduce existing wind speeds at 30 of the 46 locations, would leave them unchanged at 12 locations, and would increase them at 4 locations.

South of China Basin, the wind speed in the center of the parking area (#11) would be reduced by 1 mph to 17 mph. Along Third Street on the Lefty O'Doul Bridge (#12) and adjacent to the China Basin Building (#13), wind speeds would remain unchanged, at 6 mph and 7 mph. At two locations (#14, 15) on Berry Street, wind speeds would decrease by 6 mph and 1 mph, to 11 mph and 12 mph. Three of those five locations would meet the comfort criterion.

Wind speeds along Third Street from Berry Street to Townsend Street would decrease, averaging reductions of less than 2 mph. Wind speeds mid-block on Third Street (#16, 18) between King and Berry Streets and at the northern corners of the intersection of Third and King Streets (#22, 23) would be reduced to 11 mph to 16 mph, while the southern corners would increase 1 mph, to 19 mph (#20, 21). Moving northerly along Third Street, wind

speeds mid-block (#25, 26) between King and Townsend Streets would be reduced to 12 mph and 15 mph, and winds at the intersection (#27, 28, 29, 30) of Third and Townsend Streets would range from 11 mph to 14 mph. Two of those 12 locations would meet the comfort criterion.

At the Second Street and King Street intersection (#37, 38, 46, 60), wind speeds would range from 12 mph to 17 mph. More northerly along Second Street, wind speeds at the intersection (#31, 32, 33, 34) of Second Street and Townsend Street would decrease by an average of 1 mph, and would range from 8 mph to 14 mph. One of those eight locations would meet the comfort criterion.

Wind speeds on King Street generally would decrease. Wind speeds would decrease by about 1 mph to a speed of 17 mph mid-block (#24) between Fourth and Third Streets, decrease by an average of 2 mph to a range of 9 mph to 14 mph mid block (#39, 40, 58, 59, 61, 62, 67) between Third and Second Streets, and remain unchanged at 16 mph at two mid-block locations (#36, 49) between Second Street and The Embarcadero. Two of those 10 locations would meet the pedestrian comfort criterion.

Near The Embarcadero, wind speeds would increase by 1 mph, to 6 mph on the north side of King Street (#35) and decrease by 1 mph, to 12 mph on the south side (#69). One of those two locations would meet the pedestrian comfort criterion.

Wind speeds in the vicinity of South Beach Park (#41, 42, 43, 44, 47) would range from 9 mph to 15 mph, with decreases of between 3 mph and 7 mph. Wind speed at the South Beach Harbor (#68) would remain unchanged at 17 mph. One of these six locations would meet the pedestrian comfort criterion.

Comfort Conditions at Project-Specific Locations

A total of 23 more locations (#1-10, 17, 19, 45, 48, 50-56, 63 and 64) were measured for the project than were measured for the existing setting.[5] These were locations that would be within the proposed ballpark. The pedestrian wind criterion would be exceeded at 15 of these 23 additional, project-specific locations.

Locations #1-10, 54, 55, 56 and 63 were within the ballpark structure, on the open Upper Concourse; on the Bleacher Concourse; and on the Main Concourse. Those locations represent open areas within the structure. Locations #17 and 19 were on the Third Street sidewalk, near the entrances to the ballpark. Locations #45, 48, and 50-53 were on or near the proposed pedestrian walkway (Port Walk) that would front China Basin Channel. Location #64 was on an upper level of the ballpark, along the project's King Street frontage.

Wind speeds on the Upper Concourse (#1, 2, 4, 5, 56) would range from 13 mph to 25 mph on the Third Street side, and 12 mph on the Second Street side (#6). Wind speeds on the Bleacher Concourse (#7, 8, 9, 10) would range from 9 mph to 16 mph; wind speeds on the Main Concourse between the office building and the ballpark (#3, 54, 55, 63) would range from 13 mph to 20 mph. The wind speed at upper level (#64) would be 13 mph. Two of those 14 locations within the ballpark structure would meet the pedestrian comfort criterion.

Wind speeds at the Third Street side of the main entrance (#19) and around the corner on the King Street side (#57) would be 14 mph. Neither would meet the pedestrian comfort criterion.

Wind speeds along the Port Walk (#45, 48, 50, 51, 52, 53) would range from 8 mph to 15 mph; 5 of these 6 locations would meet the pedestrian comfort criterion.

Hazard Conditions

The project would eliminate the two existing exceedances of the wind hazard criterion. At one of those locations (#36), the wind speed with the project is reported at 36 mph, but would no longer reach the one full hour needed to exceed the criterion. The wind-hazard criterion would be exceeded at two locations in the ballpark. The total duration of the exceedances would be nearly 90 hours. The two new hazard exceedances would occur at locations on the Upper Concourse (#1 - 67 hours; #4 - 23 hours).

Test 3 - The Project plus Potential Cumulative Development

This scenario considered the project in the context of potential future development within the Mission Bay development, generally to the west and southwest of the project site. Approximate maximum building envelopes of proposed or potential development on Assessor's Blocks 3795, 3796, 3797 and 3798, bounded by Third, Townsend and Seventh Streets and China Basin, were included in this scenario. The development assumed a mix of buildings ranging from 55 ft. to 110 ft. in height, with full coverage of existing building sites.

This discussion compares the wind environment of the project with cumulative development to the winds with the Alternative and the project in the existing setting (Tests 2 and 3), not to the existing wind conditions (Test 1), because the nature of this alternative is intended to identify the effects of possible future cumulative development upon the wind environment of the site and the proposed ballpark.

The wind environment of the Project plus Potential Cumulative development would be similar to that of the project, but in general would reduce the magnitudes of the wind speeds as compared to the project. (The average wind speed decrease would be about 1 mph;

however wind speeds at some individual locations would increase or decrease by as much as 7 mph compared to project conditions, in Test 2.)

The Project plus Cumulative Development scenario would be expected to result in wind speed reductions. It is estimated that the number of pedestrian comfort criterion exceedances would be reduced by about 15 to approximately 35. Potential cumulative development would be expected to substantially reduce or eliminate the project wind hazard criterion exceedances, probably bringing the total to one or two and decreasing the total duration substantially.

Project Comfort Conditions at Basic Locations

The following description presents the best estimate of the results expected for the Project plus Cumulative Development scenario.

The Project with Cumulative Development scenario would eliminate 15 comfort criterion exceedances found with the alternative only, for a net total of 23 of the 46 basic locations.

South of China Basin, wind speeds in the center of the parking area (#11) would decrease by 2 mph relative to the winds with the project. On Third Street from the Lefty O'Doul Bridge north to the King Street intersection (#12, 13, 18, 20, 21, 22, 23), wind speeds would decrease at seven of 8 locations, by as much as 9 mph, to a range of 5 mph to 13 mph. At 2 locations (#14, 15) on Berry Street, wind speeds would decrease by 3 mph, to 8 mph to 9 mph. Between King and Townsend Streets, wind speeds would be 13 mph and 9 mph on the east side (#25) and west side (#26) of Third Street. Wind speeds at the Third and Townsend Street intersection (#27, 28, 29, 30) would increase by an average of 2 mph, ranging from 11 mph to 17 mph.

On King Street, mid-block between Third and Fourth, wind speeds would decrease to 14 mph, while wind speed on Berry Street would decrease to 9 mph. One should meet the comfort criterion.

Wind speeds at the Third Street side of the main entrance (#19) would decrease by 2 mph, to about 11 mph, while wind speed around the corner on King Street (#57) would decrease by 5 mph, to 9 mph. Both points would meet the comfort criterion.

At the Second Street and King Street intersection (#37, 38, 46, 60), wind speeds would vary, ranging from 10 mph to 16 mph. More northerly along Second Street, wind speeds at the intersection of Second Street and Townsend Street (#31, 32, 33, 34) would remain unchanged or decrease by up to 2 mph, ranging from 8 mph to 13 mph. Two of those eight locations would meet the comfort criterion.

Wind speeds at eight locations on King Street between Third and Second Streets (#39, 40, 58, 61, 62, 65, 66, 67) would decrease by an average of more than 1 mph, and speeds would range from 8 mph to 12 mph. Six of these eight locations would meet the comfort criterion.

Wind speeds at four of the five locations in the vicinity of the South Beach Park (#41, 42, 43, 44) would remain unchanged, while wind speed at one (#47) would decrease by 1 mph. Wind speeds would range from 13 mph to 15 mph. East of The Embarcadero (#68, 69), wind speeds would remain essentially unchanged, at 16 mph and 12 mph, respectively. None would meet the comfort criterion.

Estimated Comfort Conditions at Project-Specific Locations

The pedestrian wind criterion would be expected to be exceeded at 10 of the 23 additional ballpark-specific locations. Two exceedances due to the project should be eliminated.

Wind speeds at locations on the west end of the Upper Concourse (#1, 2, 4, 5, 56) would increase or decrease by up to 1 or 2 mph, remaining in a range from about 12 mph to 22 mph, while at the east end, one location (#6) would decrease to 11 mph. Wind speeds on the Bleacher Concourse (#7, 8, 9, 10) would remain unchanged at 3 locations and increase at 1, ranging from 9 mph to 17 mph, while wind speeds on the Main Concourse between the office building and the ballpark (#3, 54, 55, 63) would remain the same or change slightly, ranging from 10 mph to 20 mph. With cumulative development, the number of locations within the ballpark structure that would meet the pedestrian comfort criterion would be expected to remain the same, at four.

Wind speeds along the pedestrian walkway (#45, 48, 50, 51, 52, 53) that would front the China Basin Channel would decrease on average by 3 mph. Wind speeds would range from 9 mph to 16 mph, and 5 of these 6 locations would meet the pedestrian comfort criterion.

Estimated Hazard Conditions

The wind hazard criterion would be expected to be exceeded at one or two of the 69 locations within the ballpark. The total duration of the exceedances would be expected to be substantially less than 90 hours per year. This would be an unknown reduction from the project (Test 2) case, which would have exceedances totaling 90 hours per year. Cumulative development would be expected to reduce substantially the duration of the project exceedances.

Within the ballpark, the Project plus Cumulative Development scenario hazard exceedance would occur on the Upper Concourse (#1 - much less than 67 hours, #4 - much less than 23 hours). In addition to these hazard criterion exceedances, the wind speed at one other location (#68) is reported at 36 mph, but would not reach the one full hour needed to exceed the criterion.

Mitigation of Winds from the Project

The wind hazard criterion exceedances projected to occur within the proposed ballpark itself appear to be amenable to mitigation by the use of on-site structures, such as screens, arbors and/or trellises. It is reasonable to expect that such structures could be designed and constructed to eliminate those adverse wind conditions.

Wind-tunnel measurements demonstrated that wind speed reductions of 1 mph to 11 mph would occur at locations along the project's King and Third Street frontages and in the South Beach Park area if mature-sized landscape trees were present at spacings of approximately 40 ft., center-to-center. Those reductions would improve the general pedestrian wind environment along the project frontage sidewalks and in South Beach Park. (See Table X.B.3)

Test 4: The Reduced Project Alternative plus Existing Setting

This test scenario considered the Reduced Project Alternative, in which the Pavilion Building would not be constructed; instead, the Pavilion Building would be replaced with wall, the height of the King Street facade and the length of the Pavilion Building, placed parallel to Third Street and abutting the ballpark's King and Third Streets access ramps. In effect, this would serve to open up the space at Third and King to form a larger plaza. Wind speeds were measured at locations near the revised open space and the wind effects were traced at increasing distances from the ballpark until changes could no longer be detected; thus measurements were not made at all 69 locations for this alternative. (See Table X.B.4) Wind speeds at those locations not reported here should be considered to be the same as those reported for conditions with the project. Since this alternative is intended to explore the effects of reducing the size and overall environmental effect of the project as it is proposed, this discussion relates the wind environment to that of the project, not to that of the existing site.

TABLE X.B.3
MITIGATION TESTING - Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Mitigation - Street Trees			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
1	11				25	59		x				
2	11				19	40		x				
3	11				20	44		x				
4	11				23	56		x				
5	11				14	27		x				
6	11				12	14		x				
7	11				9	5						
8	11				11	12						
9	11				12	14		x				
10	11				16	31		x				
11	11	18	37	e	17	33	-1	e				
12	11	6	0		6	0	0					
13	11	7	0		7	1	0					
14	11	17	32	e	11	13	-6	-				
15	11	13	17	e	12	15	-1	e				
16	11	18	37	e	11	17	-6	-				
17	11				17	36		x	14	27	-3	x
18	11	18	37	e	15	29	-3	e	9	7	-6	-
19	11				14	26		x	14	25		x
20	11	18	37	e	19	41	1	e	10	10	-9	-
21	11	18	38	e	19	45	1	e				
22	11	18	38	e	12	16	-6	e				
23	11	18	39	e	16	34	-2	e				
24	11	18	38	e	17	33	-1	e				
25	11	13	19	e	12	16	-1	e				
26	11	16	32	e	15	26	-1	e				

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

TABLE X.B.3
MITIGATION TESTING - Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Mitigation - Street Trees			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
27	11	14	22	e	13	19	-1	e				
28	11	12	12	e	11	10	-1	-				
29	11	14	21	e	14	21	0	e				
30	11	13	20	e	13	18	-1	e				
31	11	13	20	e	13	21	0	e				
32	11	9	4		8	2	-1					
33	11	15	26	e	14	22	-1	e				
34	11	14	23	e	14	21	-1	e				
35	11	5	0		6	0	0					
36	11	16	28	e	16	27	0	e				
37	11	15	25	e	13	21	-1	e				
38	11	11	11		12	14	0	+				
39	11	15	24	e	14	22	-1	e				
40	11	14	19	e	14	21	0	e				
41	11	19	40	e	15	18	-3	e	11	12	-4	-
42	11	18	38	e	15	17	-3	e	12	15	-3	e
43	11	18	37	e	15	17	-3	e	13	21	-1	e
44	11	19	41	e	13	13	-6	e	10	9	-3	-
45	11				8	3						
46	11	16	29	e	17	30	1	e				
47	11	16	23	e	9	5	-7	-				
48	11				8	3						
49	11	16	31	e	16	31	0	e				
50	11				10	7						
51	11				9	5						
52	11				8	1						

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e / x / + Previous
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TABLE X.B.3
MITIGATION TESTING - Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Mitigation - Street Trees			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
53	11				15	27		x				
54	11				10	11						
55	11				14	26		x				
56	11				13	21		x				
57	11	18	42	e	14	27	-4	e	12	16	-2	e
58	11	17	33	e	10	8	-7	-				
59	11	15	30	e	14	27	-2	e	12	21	-2	e
60	11	17	34	e	12	21	-4	e	12	19		e
61	11	15	27	e	14	20	-2	e				
62	11	15	26	e	13	18	-2	e				
63	11				18	37		x				
64	11				13	23		x				
65	11	9	3		12	15	3	+				
66	11	15	24	e	11	10	-4	-				
67	11	9	4		9	4	0					
68	11	17	30	e	17	30	0	e				
69	11	13	18	e	12	17	0	e				
Averages and Changes, Total		**15**	**25**		**12**	**19**	**-1**		**12**	**17**	**-3**	
70	n/a				31	68						
71	n/a				34	68						
72	n/a				25	56						

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Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Source: Environmental Science Associates, 1997

TABLE X.B.4
Pedestrian Comfort Analysis - Reduced Project Alternative
Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Reduced Project Alternative				Reduced Project Alternative With Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
1	11				25	59		x								
2	11				19	40		x	11	10	-8	-				
3	11				20	44		x	10	6	-10	-				
4	11				23	56		x	23	45		x				
5	11				14	27		x	14	22		x				
6	11				12	14		x								
7	11				9	5										
8	11				11	12										
9	11				12	14		x								
10	11				16	31		x								
11	11	18	37	e	17	33	-1	e								
12	11	6	0		6	0	0									
13	11	7	0		7	1	0									
14	11	17	32	e	11	13	-6	-	16	29	5	#				
15	11	13	17	e	12	15	-1	e								
16	11	18	37	e	11	17	-6	-	16	30	5	#				
17	11				17	36		x	14	22	-3	x				
18	11	18	37	e	15	29	-3	e	18	34	3	e				
19	11				14	26		x	14	22		x				
20	11	18	37	e	19	41	1	e	15	26	-3	e				
21	11	18	38	e	19	45	1	e	17	32	-2	e				
22	11	18	38	e	12	16	-6	e								
23	11	18	39	e	16	34	-2	e								
24	11	18	38	e	17	33	-1	e								
25	11	13	19	e	12	16	-1	e								
26	11	16	32	e	15	26	-1	e								

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.4
Pedestrian Comfort Analysis - Reduced Project Alternative
Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Reduced Project Alternative				Reduced Project Alternative With Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
27	11	14	22	e	13	19	-1	e								
28	11	12	12	e	11	10	-1	-								
29	11	14	21	e	14	21	0	e								
30	11	13	20	e	13	18	-1	e								
31	11	13	20	e	13	21	0	e					12	16	-1	e
32	11	9	4		8	2	-1						8	3		
33	11	15	26	e	14	22	-1	e					11	11	-3	-
34	11	14	23	e	14	21	-1	e					10	7	-3	-
35	11	5	0		6	0	0						5	0	-1	
36	11	16	28	e	16	27	0	e					9	4	-7	-
37	11	15	25	e	13	21	-1	e					19	39	6	e
38	11	11	11		12	14	0	+					11	11		-
39	11	15	24	e	14	22	-1	e								
40	11	14	19	e	14	21	0	e								
41	11	19	40	e	15	18	-3	e								
42	11	18	38	e	15	17	-3	e								
43	11	18	37	e	15	17	-3	e								
44	11	19	41	e	13	13	-6	e								
45	11				8	3										
46	11	16	29	e	17	30	1	e					18	36	1	e
47	11	16	23	e	9	5	-7	-								
48	11				8	3										
49	11	16	31	e	16	31	0	e					15	27	-1	e
50	11				10	7										
51	11				9	5										
52	11				8	1										

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

TABLE X.B.4
Pedestrian Comfort Analysis - Reduced Project Alternative
Giants Ballpark, San Francisco, California
Wind Test, August 1996 and January 1997

References		Existing Conditions			Project Conditions				Reduced Project Alternative				Reduced Project Alternative With Cumulative Development			
Location Number	Pedestrian Comfort Criterion Speed (mph)	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Existing (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds	Measured Equivalent Wind Speed (mph)	Percent of Time Wind Exceeds Criterion Speed	Speed Change Relative to Project (mph)	Exceeds
53	11				15	27		x								
54	11				10	11			11	11	1					
55	11				14	26		x	11	9	-3	-				
56	11				13	21		x	5	0	-8	-				
57	11	18	42	e	14	27	-4	e	10	7	-4	-				
58	11	17	33	e	10	8	-7	-								
59	11	15	30	e	14	27	-2	e								
60	11	17	34	e	12	21	-4	e					15	24	2	e
61	11	15	27	e	14	20	-2	e								
62	11	15	26	e	13	18	-2	e								
63	11				18	37		x	12	11	-6	x				
64	11				13	23		x								
65	11	9	3		12	15	3	+								
66	11	15	24	e	11	10	-4	-								
67	11	9	4		9	4	0									
68	11	17	30	e	17	30	0	e					16	30		e
69	11	13	18	e	12	17	0	e					12	14		e
Averages and Changes, Total		**15**	**25**		**12**	**19**	**-1**		**14**	**20**	**-0**		**12**	**9**	**-0**	
70	n/a				31	68			25	33	-6					
71	n/a				34	68										
72	n/a				25	56										

Key e Existing winds exceed Criterion speed more than 10% of the time.

Key x New, Project-specific
\+ New, changes existing
\- Eliminates existing

Key # New, due to Alternative
e / x / + Previous
\- Eliminates previous

Key # New, due to Cumulative
e / x / + Previous
\- Eliminates previous

Source: Environmental Science Associates, 1997

The wind environment of the Reduced Project Alternative would be similar to, but generally slightly less windy than that of the project. The average wind speed would decrease by less than 1 mph; however, at individual locations some wind speeds would increase by as much as 10 mph and some would decrease by as much as 8 mph as compared to those wind speeds that would occur with the project. Compared with the project, wind speeds would decrease at 9 locations, increase at 4 locations, and remain the same at all other locations.

Overall, the Reduced Project Alternative would eliminate 5 pedestrian wind comfort criterion exceedances and add 2 exceedances, for a net total of 47 exceedances out of 658 pedestrian test locations.

These data suggest that the effect of the Reduced Project Alternative would be to reduce wind speeds in the vicinity of the Third Street entrances and plazas of the project.

Comfort Conditions at Basic Locations

South of China Basin the wind speed in the center of the parking area would not change. Along Third Street from Berry Street north to the King Street intersection, wind speeds would vary, decreasing by as much as 3 mph and increasing by as much as 5 mph, resulting in a range from 16 mph to 20 mph. North of the intersection, wind speeds would not change.

Wind speeds at one location on the Third Street side of the main entrance would increase by 3 mph, to 14 mph, while wind speed at another around the corner on the King Street side would remain unchanged, at 11 mph.

Further from the Third and King Street intersection, wind speeds mid-block on King, at the Second Street and King Street intersection, and in the vicinity of the South Beach Park would not change.

Comfort Conditions at Project-Specific Locations

Wind speeds on the Upper Concourse near the Third and King Street intersection would decrease by 8 mph and 10 mph, to 10 mph and 11 mph at 2 locations and remain unchanged, at 23 mph and 14 mph at 2 others. Wind speeds at 4 of 5 locations on the Main Concourse between the Pavilion and the ballpark would decrease by 3 mph to 8 mph, and would range from 5 mph to 12 mph, while an increase of 1 mph, to 11 mph, would occur at the remaining location. Wind speeds on the Bleacher Concourse or along the pedestrian walkway fronting China Basin would not change.

Hazard Conditions

The Reduced Project Alternative would add two new wind hazard exceedances in addition to those identified for the project; with this alternative, the wind hazard criterion would be exceeded at a total of 3 of the 68 locations. Two new wind hazard conditions would occur: one on the east side of Third Street at the Berry Street intersection (about one hour per year) and, one at the southwest entrance to the ballpark, near the Port Walk (about one hour per year).

One Upper Concourse hazard criterion exceedance with the project would be eliminated; a 67-hour hazard criterion exceedance would be eliminated. The duration of a project exceedance at another location on the Upper Concourse would be reduced by 12 hours. The duration of the new exceedances added by the Reduced Project Alternative would be 2 hours; the total duration of the three exceedances with this alternative would be about 37 hours.

NOTES - Wind

1. The current project design was not tested in the cumulative development context. However the similarities between the current project design and a prior design allow use of a pair of

tests of that prior design with and without Cumulative Development for purposes of evaluating wind conditions for the Project plus Cumulative Development scenario. A comparison of wind speeds at measurement points tested for the project and for the prior design shows that differences of 6 mph to 10 mph occur only at five locations between the Pavilion Building and the ballpark structure; smaller differences of 3 mph to 5 mph occur at seven locations in the same area; and, differences of 2 mph or less occur at 13 locations along the Third Street frontage, the King Street frontage and the Port Walk. At the remaining 44 test locations, the differences between the current project design and the prior design are expected to be insignificant. Thus, it is reasonable to use the Prior Design with Cumulative Development test directly to estimate the wind speeds for the Project plus Cumulative Development scenario in cases where the differences noted above are 2 mph or less. For those 12 locations where the differences between the project and alternative are greater than 2 mph, the change due to the Prior Design with Cumulative Development scenario was applied to estimate wind speeds for the Project with Cumulative Development scenario.

2. Lawson, T.V. and A.D. Penwarden, "The Effects of Wind on People in the Vicinity of Buildings," Proceedings of the Fourth International Conference on Wind Effects on Buildings and Structures, London, 1975, Cambridge University Press, Cambridge, U.K., 1976, pp. 605-622.

3. Equivalent mean wind speed is defined as the mean wind, multiplied by the quantity (one plus three times the turbulence intensity) divided by 1.45.

4. Arens, E., "Designing for Acceptable Wind Environment," Transactions Engineering Journal, ASCE 107, No. TE 2, 1981, pp. 127-141.

5. Three locations (#70, 71, 72) at the top of the ballpark structure were measured to indicate wind conditions above the canopy of the structure. These locations would be inaccessible to the public, and are not relevant to either the pedestrian comfort analysis or the wind hazard analysis.

C. TRANSPORTATION AND CIRCULATION

INTRODUCTION

This appendix provides additional information on transportation data and approaches used in the EIR analysis. It includes tables and figures referenced in the EIR text, as well as a brief description of forecasts of future travel demand used in the cumulative impacts analysis. Tables and figures are briefly noted in the text below, and for the most part are found following the appendix text.

Level of Service

Level of service is a concept used throughout the EIR transportation analysis to describe operating conditions for transportation facilities, including freeways, arterials, intersections, sidewalks and crosswalks. For all facilities, Level of Service (LOS) A denotes unrestricted free-flow operations and LOS F denotes jammed forced-flow conditions. LOS D is the standard adopted by the City of San Francisco for acceptable surface street intersections. LOS E is the standard adopted by the San Francisco County Congestion Management Agency in 1991 for freeways and arterials on the Congestion Management Program (CMP) network (refer to discussion of "CMP Requirements" in the *Background Transportation Report*). Freeway level of service criteria are shown in Table X.C.1, p. A.98; level of service definitions for intersections are shown on Figure X.C.1, p. A.99, "Level of Service Diagram."

Setting Background

Details on the traffic study area street system are provided in Table X.C.2, pp. A.100 - A.102. Existing transit capacity information is provided for each Municipal Railway line in Table X.C.3, p. A.103, and grouped by screenline in Table X.C.4, p. A.104.

Details of the parking occupancy surveys are presented in Table X.C.5, pp. A.105 - A.106; this table includes information on the total number of public and private parking spaces and provides the spaces occupied, as a percentage of the total spaces, in parking lots and garages on each Assessor's Block in the parking study area, as collected by three separate studies and as compiled into a final listing as used for the EIR parking analysis.

Table X.C.6, pp. A.107 - A.117, provides existing pedestrian conditions in crosswalks and on sidewalks for pedestrian study area locations shown on Figure X.C.2, p. A.118. Definitions of pedestrian service levels are contained in Table X.C.7, p. A.119.

Methodology Background Information

The methods and assumptions used in the transportation analysis are summarized in the beginning of the Transportation Impacts section (Section IV.E) of the EIR text. Additional information is provided below on some of these assumptions.

Origin/Destination Information

The methodology includes assumptions about where baseball fans who will attend a game begin their trip to the ballpark (trip origin) and where attendees go after the game is over (post-game destination). The results of this analysis are shown graphically for both existing attendees at 3Com Park and for the proposed new ballpark at China Basin in Figures X.C.3 and X.C.4, p. A.120 and A.121. The analysis was based on surveys made at various times at 3Com Park as cited in the EIR text with some adjustments based on the location of the proposed new ballpark. Trips for visitors and all non-home based trips are assumed to originate in downtown San Francisco and are included in that portion of each distribution diagram. The analysis is described in more detail in the *Background Transportation Report*, Chapter 3, under "Travel Distribution."

Automobile Occupancy

Automobile occupancy rates were obtained from a variety of surveys for various stadiums and ballparks to provide background for assumptions used for analysis of the Giant's ballpark at China Basin. A summary of the results of these various surveys is presented in Table X.C.8, p. A.122.

Cumulative Growth Assumptions

A set of regional models used by Metropolitan Transportation Commission (MTC) staff to forecast year 2015 traffic volumes was obtained by Wilbur Smith Associates to establish the base cumulative context for the transportation study of the San Francisco Giants' ballpark. Documentation of the MTC regional traffic model by MTC staff is found in Appendix G of the *Background Transportation Report*. The assumptions for growth in selected areas of San Francisco used in the MTC model are listed in Table X.C.9, p. A.94. These growth assumptions are based on regional economic, land use and planning information prepared by the Association of Bay Area Governments (ABAG).

The MTC travel model is a tool intended to be used to forecast growth on regional transportation systems (freeways, major highways, Bay Area Rapid Transit, etc.). It is not intended to provide accurate traffic forecasts on a local, block-by-block level. It is appropriate, however, to incorporate the MTC model traffic information into the cumulative analysis of local intersection traffic by comparing the results of the local area traffic model with overall results of the MTC model for the same area.

The employment and housing forecasts for each MTC analysis zone were reviewed and compared with employment and housing estimates related to planning and development activities in the areas near the project site (see Table X.C.9 and map). The specific planning and development proposals used are described in the EIR Transportation Impacts Chapter and

Zone Boundaries	MTC Zone	Number of Households	Number of Jobs
Market, Howard, First, and the San Francisco Bay	428	352	5,533
Market, Howard, First, and Fourth	427	0	5,381
Howard, Harrison, Third, and the San Francisco Bay	382	1,078	9,017
Howard, Harrison, Third, and Sixth	661	312	5,211
Harrison, Townsend, Third, and the San Francisco Bay	659	2,667	5,576
Harrison,Townsend, Third and Sixth Streets	660	648	2,780
Townsend, Seventh Street, China Basin Channel, and the San Francisco Bay	658	0	9,578
Sixteenth, Seventh Streets, China Basin Channel, and the San Francisco, Bay	657	2,062	2,097
Townsend, Division, U.S.. 101, Seventeenth, Mississippi, and Seventh Streets	381	0	4,463
Sixteenth Street, I-280, Twenty-Fifth Street, and San Francisco, Bay	662	350	3,398

SOURCE: MTC staff, compiled by Wilbur Smith Associates

GIANTS BALLPARK

Table X.C.9 Year 2015 Demographic Growth Forecast from the MTC Regional Travel Demand Models

include additional growth based on the San Francisco Port's *Waterfront Land Use Plan*, the Transbay Terminal Redevelopment Survey Area, the United States Postal Service's Rincon Entertainment Center mixed use proposal, the Catellus Development Corporation's proposed development program for the portion of the Mission Bay Area north of China Basin Channel, and the proposed GAP, Inc. World Headquarters building at Folsom and Harrison Streets. Adjustments were made at an MTC zone level if development programs suggested that MTC numbers of households and/or employees were either too small or too large for current, reasonably forseeable development.

Household projections for most of the analysis zones appeared to be reasonably able to account for expected growth based on a review of proposed plans and development projects. For example, the four zones that make up an area similar to the Transbay Terminal Redevelopment Survey Area (MTC zones 427, 428, 382, and 659) include a forecast of about 4,100 additional households. This would reasonably include the 3,700 to 5,400 dwelling units projected to be developed in the preliminary Concept Plan for the Transbay Terminal study area. However, the numbers of jobs listed for these same zones appeared to be somewhat lower than would be expected given growth projected for the Transbay Terminal area in the Concept Plan. Jobs were increased for the MTC zones in and around the Transbay Terminal area based on a review of the Mission Bay employment and housing projections.

The proposal by Catellus Development Corporation for the Mission Bay area north of China Basin Channel would not reasonably fit within the MTC model's growth projections as provided by ABAG. That portion of Catellus' Mission Bay development that is north of China Basin Channel (MTC zone 658) is forecast to increase by 9,578 jobs but with no increase in households. It is apparent that the ABAG/MTC demographic forecasts are based on the previously approved plan for Mission Bay that proposed office development north of China Basin Channel. To better reflect the allocations of housing units and jobs that are suggested by the most recent land use proposals for the area, the following adjustments were made. For zone 658, which includes Mission Bay north of China Basin Channel, 3000

housing units were added, and 6,578 of the total 9,578 jobs were shifted to zones 427, 428, 382, and 659 to better reflect the potential for employment growth in the Transbay Terminal study area. Another 1,000 jobs were shifted to zone 657, which represents most of the Mission Bay Plan area south of the Channel. Consistent with the current Mission Bay proposal for the north of the Channel area, 2,000 jobs remain in Zone 658. Another 1,000 housing units were also added to zone 657, bringing the total number of units south of the Channel in Mission Bay to 3,237, or over 6,000 units for the total Mission Bay Project by the year 2015. With these adjustments the household and employment projections exceed the MTC model cumulative development plans in each zone within the study area. (See Appendix G, particularly Table G-1, in the *Background Transportation Report* for more detail.)

Trip Generation for UCSF/Mission Bay 2015 Cumulative Scenario

Table X.C.10, p. A.123, provides detail on the trip generation calculations for the land uses assumed for the portion of Mission Bay south of China Basin Channel in this second cumulative analysis scenario described in the EIR Transportation Impacts Chapter. The trip generation rates were derived either from the *Mission Bay EIR* (86.505E, certified August, 1990) or from the *San Francisco Guidelines for Environmental Review of Transportation Impacts,* July 1991 (SF Guidelines). Person and vehicle trips from the proposed UCSF New Major Campus land uses included in this cumulative scenario were derived directly from the *UCSF Long Range Development Plan EIR.*

Impacts Background Information

Figures X.C.5 and X.C.6, pp. A.124 - A.125, show the distribution on local streets and freeway ramps of automobile trips leaving the Project study area after a weekday afternoon game (3:30 - 4:30 PM) and arriving for a weekday night ballgam (6:30 - 7:30 PM).

Tables X.C.11 and X.C.12, pp. A.126 and A.127, summarize parking supply and demand and provide a list of existing parking spaces assumed to be removed and unavailable to Giants fans due to development on parking lot sites through the year 2000 and through the year 2015.

Table X.C.13, pp. A.128 - A.134, provides details about the pedestrian impacts analysis on crosswalks and sidewalks in the vicinity of the ballpark leading toward parking lots and transit stations (See Figure X.C.2 for pedestrian study locations and Table X.C.7 for definitions of pedestrian levels of service).

Background information on bicycle use at representative ballparks around the country is provided in Table X.C.14, p. A.135. Project construction truck operations for various phases of construction is provided in Table X.C.15, p. A.136.

TABLE X.C.1
LEVEL OF SERVICE CRITERIA FOR FREEWAY(*) SECTIONS

LOS	Maximum Density (passenger cars per mile, per lane)	Minimum Speed	Max. Service Flow Rate (passenger cars per hour, per lane)	Maximum Volume-to-Capacity Ratio
A	10.0	60 mph	600	0.25
B	16.0	60 mph	960	0.42
C	24.0	55 mph	1,440	0.63
D	32.0	41 mph	1,824	0.79
E	46.0	30 mph	2,300	1.00
F	varies	varies	varies	varies

Note:
* Six to eight-lane freeways with a 60 mph free flow speed.

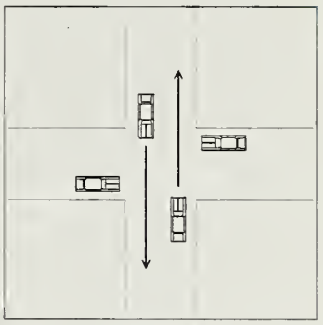
Source: *Highway Capacity Manual, Transportation Research Board, Special Report No. 209*, Washington, DC, 1994, modified to fit criteria established in annual monitoring reports published by SFCTA. Wilbur Smith Associates.

The OPERATIONS LEVEL METHODOLOGY , which is described in the Transportation Research Board's Highway Capacity Manual , defines Level of Service (LOS) for signalized intersections in terms of delay. Technically, delay is the amount of time an average vehicle must wait at an intersection before being able to pass through the intersection. For signalized intersections, the relationship between LOS and delay is based on the average stopped delay per vehicle for a fifteen minute period.

LEVEL OF SERVICE 'A' - Delay 0.0 to 5.0 seconds

Describes operations with very low delay, i.e., less than 5 seconds per vehicle. This occurs when signal progression is extremely favorable. Most vehicles arrive during the green phase and are not required to stop at all.

Corresponding V/C ratios usually range from 0.00 to 0.60.



LOS 'A'

LEVEL OF SERVICE 'B' - Delay 5.1 to 15.0 seconds

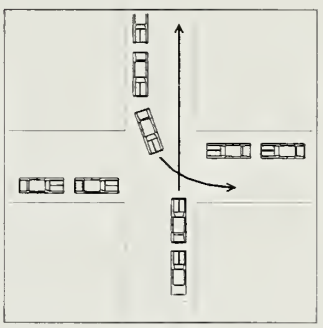
Describes operations with delay in the range of 5 to 15 seconds per vehicle generally characterized by good signal progression and/or short cycle lengths. More vehicles are required to stop than for LOS 'A' causing higher levels of average delay.

Corresponding V/C ratios usually range from 0.61 to 0.70.

LEVEL OF SERVICE 'C' - Delay 15.1 to 25.0 seconds

Describes operations with delay in the range of 15 to 25 seconds per vehicle. Occasionally, vehicles may be required to wait more than one red signal phase. The number of vehicles stopping at this level is significant although many still pass through the intersection without stopping.

Corresponding V/C ratios usually range from 0.71 to 0.80.

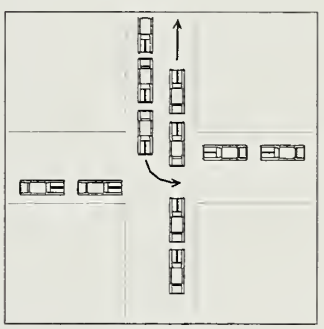


LOS 'C'

LEVEL OF SERVICE 'D' - Delay 25.1 to 40.0 seconds

Describes operations with delay in the range of 25 of 40 seconds per vehicle. At LOS 'D', the influence of congestion becomes more noticeable. Many vehicles stop, and the proportion of vehicles not stopping declines. The number of vehicles failing to clear the signal during the first green phase is noticeable.

Corresponding V/C ratios usually range from 0.81 to 0.90.



LOS 'D'

LEVEL OF SERVICE 'E' - Delay 40.1 to 60.0 seconds

Describes operations with delay in the range of 40 to 60 seconds per vehicle. These high delay values generally indicate poor signal progression, long cycle lengths and high V/C ratios. Vehicles frequently fail to clear the intersection during the first green phase.

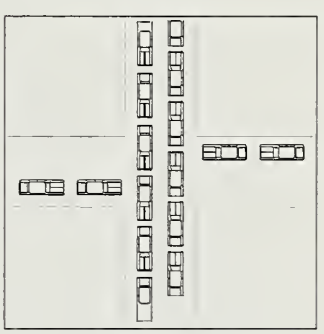
Corresponding V/C ratios usually range from 0.91 to 1.00.

LEVEL OF SERVICE 'F' - Delay 60.1 seconds plus

Describes operations with delay in excess of 60 seconds per vehicle. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection.

Corresponding V/C ratios of over 1.00 are usually associated.

SOURCE: Transportation Research Board, "Operations Level Methodology-Signalized Intersections", *Highway Capacity Manual* Special Report 209, 1985.



LOS 'F'

EIR\LOS-HCS-1/23/97

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

Figure X.C.1 Level of Service Diagram

TABLE X.C.2
STUDY AREA STREET CLASSIFICATIONS [1]

Street	Functional Street Classifications							
	Transit	Vehicular	No. of Lanes	CMP Network	MTS[3] Network	Pedestrian	Bicycle	Freight
East-West Streets								
Market	Primary Transit: Transit Oriented	Transit Conflict Street	Four 2-Way	Transit Conflict Street	---	Citywide Ped. Network Neighborhood Commercial	Citywide Bicycle Route	---
Mission	Primary Transit: Transit Oriented	Transit Conflict Street	Four 2-Way	Transit Conflict Street	---	Citywide Ped. Network Neighborhood Commercial	---	---
Howard	Secondary Transit: 1st St. to 2nd St.; Main to Beale	Major Arterial	Four Primarily 1-Way	Yes	Yes	---	Citywide Bicycle Route	---
Folsom		Major Arterial	Four Primarily 1-Way	Yes	Yes	---	Citywide Bicycle Route	---
Harrison	Transit Important: 4th St. to 7th St. Secondary Transit: 7th St. to 11th St.	Major Arterial	Four Primarily 1-Way	Yes	Yes	Neighborhood Commercial: 4th St. to Division	---	---
Bryant	Transit Important: 3rd St. to 7th St. Secondary Transit: 7th St. to 11th St.	Major Arterial	Five Primarily 1-Way	Yes	Yes	Neighborhood Commercial: 4th St. to 11th St.	---	---
Brannan		Major Arterial: 5th St. to 6th St.	Two to Four 2-way	5th St. to 6th St.	5th St. 6th St.	---	---	---
Townsend	Transit Oriented: 3rd St. to 4th St.	---	Two 2-Way	---	---	Neighborhood (Ped) Network Connection Street	Citywide Bicycle Route: West of 3rd St.	---
King	Transit Important: East of 6th St.	Major Arterial: 4th St. to Embarcadero	Four 2-Way	4th St. to Embarcadero	4th St. to Embarcadero	Neighborhood Commercial: Bay Trail: 4th St. to Embarcadero	Citywide Bicycle Route: East of 3rd St.	Significant Truck Traffic East of 4th St.
Division	Secondary Transit: Bryant to Potrero	Major Arterial: West of Potrero	Four 2-Way	Yes	Yes	---	Citywide Bicycle Route: Townsend to 11th St.	Significant Truck Traffic Potrero to S. Van Ness

Notes:
1. As designed in the Transportation Element of the City's General Plan.
2. CMP refers to Congestion Management Program Network.
3. MTS refers to the Metropolitan Transportation System.

TABLE X.C.2
STUDY AREA STREET CLASSIFICATIONS [1]

Street	Functional Street Classifications							
	Transit	Vehicular	No. of Lanes	CMP Network	MTS[3] Network	Pedestrian	Bicycle	Freight
East-West Streets (cont.)								
Berry			Two to Three 2-Way	---	---	---	---	---
16th St.	Transit Oriented: West of Kansas	Secondary Arterial West of 3rd St.	Two to Four 2-Way	---	Yes	Neighborhood Commercial: West of Harrison	Citywide Bicycle Route: East of Kansas	---
17th St.			2-Way	---	---	---	Citywide Bicycle Route: West of Kansas	---
Mariposa			Two to Four 2-way	---	---	----	Citywide Bicycle Route: East of Mississippi	---
North-South Streets								
Embarcadero	Primary Transit: Transit Important	Major Arterial	Four to Six 2-Way	Yes	Yes	Neighborhood Commercial Bay Trail	Citywide Bicycle Route	Significant Truck Traffic
Stewart	Transit Oriented: Market to Mission	Transit Conflict: Market to Mission	Two 1-way	Market to Mission	---	Neighborhood Commercial: Mission to Embarcadero	---	---
Spear				---	---	---	---	---
Main	Transit Important: Market to Mission Transit Oriented: Mission to Howard	---	Three Primarily 2-Way	---	---	---	---	---
Beale	Transit Important: Market to Mission Transit Oriented: Mission to Howard	Major Arterial: Market to Mission	Four 1-Way	Market to Mission	North of Bryant	---	---	---
Fremont	Transit Important: Market to Mission	Major Arterial: North of Bryant	Four 1-Way	North of Bryant	Yes	Neighborhood Commercial: Market to Folsom	---	---
First	Transit Important: Market to Howard	Major Arterial: North of Bryant	Four 1-Way	North of Bryant	Yes	Neighborhood Commercial: Market to Folsom	---	---

Notes:
1. As designed in the Transportation Element of the City's General Plan.
2. CMP refers to Congestion Management Program Network.
3. MTS refers to the Metropolitan Transportation System.

TABLE X.C.2
STUDY AREA STREET CLASSIFICATIONS [1]

Street	Functional Street Classifications							
	Transit	Vehicular	No. of Lanes	CMP Network	MTS[3] Network	Pedestrian	Bicycle	Freight
North-South Streets (cont.)								
Second	Secondary Transit: Howard to Harrison	---	Four 2-way	---	---	Neighborhood Commercial	Citywide Bicycle Route	---
Third	Primary Transit Transit Important: North of King; South of Mission Rock	Major Arterial	Four to Five 1-Way North of King	Yes	Yes	Citywide Ped. Network: North of Folsom Neighborhood Commercial	Citywide Bicycle Route: South of Townsend	Significant Truck Traffic: South of Mission Rock
Fourth	Primary Transit Transit Important	Major Arterial	Four 1-Way	Yes	Yes	Bay Trail: South of King Citywide Ped. Network: North of Folsom Neighborhood Commercial	---	Significant Truck Traffic: South of King
Fifth		Major Arterial: Market to Brannan	Four 2-Way	North of Brannan	Howard to Brannan	Neighborhood Commercial: Market to Mission	Citywide Bicycle Route: North of Townsend	---
Sixth		Major Arterial: Market to King	Four 2-Way	North of King	Howard to King	Neighborhood Commercial: Market to Folsom	---	---
Seventh		Major Arterial: Market to Bryant. Secondary Arterial: Bryant to 16th St.	Four 1-Way North of Brannan	North of Brannan	Howard to 16th St.	Neighborhood Commercial: Market to Howard	Citywide Bicycle Route	---
Eighth		Major Arterial: Market to Bryant	Four 1-Way	North of Bryant	North of Bryant	Neighborhood Commercial: Market to Mission	---	---
De Haro			Two 2-Way	---	---	Neighborhood Network: 17th St. to 20th St.	---	---
Potrero	Secondary Transit	Major Arterial	Six 2-way	Yes	Yes	Neighborhood Commercial: 24th St. to 25th St.	Citywide Bicycle Route 17th St. to 23rd St.	---

Notes:
1. As designed in the Transportation Element of the City's General Plan.
2. CMP refers to Congestion Management Program Network.
3. MTS refers to the Metropolitan Transportation System.

Source: Wilbur Smith Associates; November 1996.

TABLE X.C.3
MUNI TRANSIT DATA SUMMARY (WEEKDAY PM PEAK HOUR)

MUNI Route	Number of Buses/ Hour	Capacity per Vehicle	Hourly Capacity	Hourly Average Load	% Hourly Capacity Utilized	Maximum Load Point
1	20	63	1,260	945	75%	Sacramento/Powell
2	6	63	378	264	70%	Sutter/Powell
5	15	63	945	606	64%	McAllister/Van Ness
6	7	63	441	221	50%	Market/Van Ness
7	7	63	441	244	55%	Market/Van Ness
9	8	94	752	599	80%	Potrero/16th
12	3	63	189	130	69%	Pacific/Powell
14	8	94	752	531	71%	Mission/16th
14X	6	94	564	254	45%	Mission/5th
15	10	94	940	276	29%	4th/Townsend
21	10	63	630	372	59%	Hayes/Van Ness
30	15	63	945	765	81%	Stockton/Sutter
30X	8	63	504	377	75%	Chestnut/Van Ness
31	7	94	658	246	37%	Eddy/Van Ness
32	4	63	252	34	13%	Embarcadero/Ferry
38	6	94	564	516	91%	Geary/Van Ness
38L	15	94	1,410	735	52%	Geary/Van Ness
42	7	63	441	200	45%	Van Ness/N. Point
45	10	63	630	504	80%	Stockton/Sutter
66	3	45	135	28	21%	Market/Van Ness
71	6	63	378	186	49%	Market/Van Ness
80X	6	63	378	268	71%	Beale/Mission
81X	6	63	378	142	38%	Beale/Mission
82X	3	63	189	133	70%	Beale/Mission
J	8	119	952	660	69%	Market/Van Ness
K	7	119	833	596	72%	Market/Van Ness
L	17	119	2,023	1,673	83%	Market/Van Ness
M	9	119	1,071	548	51%	Market/Van Ness
N	15	119	1,785	1,246	70%	Market/Van Ness

Notes:

Capacity per Vehicle - Capacity per vehicle is based on MUNI planning design standards of 45, 63, 94 and 119 passengers per vehicle for 30-, 40- and 60-foot buses and SLRVs respectively, which assumes some standees.

Maximum Load Point - Maximum load point on a transit route represents the location where the transit vehicle carries the most passengers.

Sources: David Makofsky, MUNI Schedules, Data Services, telephone conversation, January 2, 1997.
Wilbur Smith Associates.

TABLE X.C.4
EXISTING TRANSIT DATA SUMMARY - SCREENLINE CAPACITIES
(WEEKDAY PM PEAK HOUR)

Screenline[1]	MUNI Routes	Hourly Capacity[2]	Existing Hourly Load	Existing Percent Capacity Utilized
Northeast	15 (ib), 30 (ib), 30X (ob), 32 (ib), 42 (ib), 45[3]	4,222	2,081	49%
Northwest	1, 2, 5, 21, 31, 38, 38L	4,501	3,684	82%
Southwest	6, 7, 12, 14, 66, 71 F, J, K, L, M, N	9,504	6,329	67%
Southeast	9, 14X, 15 (ob), 30 (ob), 32 (ob), 42 (ob), 80X, 81X, 82X	4,958	2,703	55%
South of Market sub-screenline	15, 30, 32, 42, 45, 80X, 81X, 82X	4,149	2,280	55%

Notes:
1. See Figure 2-16 in Background Transportation Report for Screenline Locations.
2. Capacity based on published MUNI time tables, Fall 1996, and may not include the effect of missed or later runs.
3. (ib) = inbound; (ob) = outbound

Source: Wilbur Smith Associates; MUNI Data Services, January, 1997; MUNI Statistics, 1995.

TABLE X.C.5
OCCUPANCY SUMMARY

TOTAL INVENTORY

Block Time Category	Public	Private	On-Street
0 to 5	490	482	503
5 to 10	1,413	824	1,336
10 to 15	4,582	1,750	1,713
15 to 20	5,014	1,622	1,622
> 20	4,749	393	729
Total	15,948	5,071	5,903
Total, within 15 min.	6,485	3,056	3,552

TOTAL OCCUPANCY: *Weekday Midday w/ Existing Conditions*

	Public		Private		On-Street	
Block Time Category	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy
0 to 5	54	88.9%	160	66.8%	7	98.6%
5 to 10	211	85.1%	236	71.4%	13	99.0%
10 to 15	840	81.7%	847	51.6%	200	88.3%
15 to 20	948	81.1%	586	63.9%	9	99.4%
> 20	2,418	49.1%	143	63.6%	49	93.3%
Total	4,438		1,972		278	
Total, within 15 min.	1,105		1,243		220	

TOTAL OCCUPANCY: *Weekday Evening w/Existing Conditions*

	Public		Private		On-Street	
Block Time Category	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy
0 to 5	119	37.4%	316	34.4%	191	62.0%
5 to 10	1,117	20.9%	443	46.2%	462	65.4%
10 to 15	3,393	25.9%	1,255	28.3%	946	44.8%
15 to 20	3,405	32.1%	970	40.2%	379	76.6%
> 20	3,398	28.4%	228	42.0%	202	72.3%
Total	11,432		3,212		2,180	
Total, within 15 min.	4,629		2,014		1,599	

TOTAL OCCUPANCY: *Saturday Midday w/ Existing Conditions*

	Public		Private		On-Street	
Block Time Category	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy	Spaces Available	Percent Occupancy
0 to 5	168	11.6%	160	66.8%	15	97.0%
5 to 10	1,065	24.6%	236	71.4%	160	88.0%
10 to 15	3,103	32.3%	847	51.6%	546	68.1%
15 to 20	3,620	27.8%	586	63.9%	8	99.5%
> 20	2,150	54.7%	143	63.6%	2	99.7%
Total	10,106		1,972		731	
Total, within 15 min.	4,336		1,243		721	

Source: Pittman & Hanes Associates

TABLE X.C.5 (cont.)
PARKING INVENTORY SURVEYS COMPARISONS

	Pittman & Hames		Robert Harrison		Korve		DCP Survey		Final Reconciliation	
Block Time Category	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
0 to 5	190	230	205	489	30	107	205	489	190	482
5 to 10	888	403	1,440	1,179	17	167	744	1,179	1,413	824
10 to 15	3,858	833	4,525	1,986	1,421	341	4,732	1,831	4,582	1,750
15 to 20	4,042	991	4,081	1,814	4,345	357	4,364	1,604	5,014	1,622
> 20	982	0	4,699	393	0	0	2,867	393	4,749	393
Total	9,960	2,457	14,950	5,861	5,813	972	12,912	5,496	15,948	5,071
Total, within 15 min	4,936	1,466	6,170	3,654	1,468	615	5,681	3,499	6,185	3,056

Sources: Pittman & Hames Associates Parking Survey, July 1996; Robert L. Harrison, China Basin Ballpark Survey, November 1994; Korve Engineering Rincon Entertainment Center Parking Survey, Department of City Planning, 1992.

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Third Street/King Street (crosswalk locations)							
Crossing Third Street north side	East-West Crosswalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
Crossing Third Street south side	East-West Crosswalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
Crossing King Street east side	North-South Crosswalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
Crossing King Street west side	North-South Crosswalk	3:30 - 4:30 PM	18' 6"	18' 6"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	18' 6"	18' 6"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	18' 6"	18' 6"	NA/UC[4]		NA/UC[4]
Fourth Street/Townsend Street (crosswalk locations)							
Crossing Townsend Street east side	North-South Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	83	0.4	Open/A
		6:30 - 7:30 PM	13' 0"	13' 0"	52	0.3	Open/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	11	0.3	Open/A
Crossing Townsend Street west side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	277	2.4	Impeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	172	1.5	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	25	0.1	Open/A
Crossing Fourth Street north side	East-West Crosswalk	3:30 - 4:30 PM	14' 0"	14' 0"	62	0.2	Open/A
		6:30 - 7:30 PM	14' 0"	14' 0"	27	0.1	Open/A
		SAT. 4 - 5 PM	14' 0"	14' 0"	20	0.1	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Fourth Street/Townsend Street (crosswalk locations - continued)							
Crossing Fourth Street south side	East-West Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	300	1.0	Unimpeded/A
		6:30 - 7:30 PM	13' 0"	13' 0"	272	0.9	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	19	0.1	Open/A
Fourth Street/King Street (crosswalk locations)							
Crossing Fourth Street north side	East-West Crosswalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
Embarcadero/Bryant Street (crosswalk locations)							
Crossing Bryant Street west side	North-South Crosswalk	3:30 - 4:30 PM	17' 4"	17' 4"	38	0.1	Open/A
		6:30 - 7:30 PM	17' 4"	17' 4"	66	0.2	Open/A
		SAT. 4 - 5 PM	17' 4"	17' 4"	30	.05	Open/A
Crossing Embarcadero north side	East-West Crosswalk	3:30 - 4:30 PM	20' 0"	20' 0"	13	0.1	Open/A
		6:30 - 7:30 PM	20' 0"	20' 0"	2	<0.1	Open/A
		SAT. 4 - 5 PM	20' 0"	20' 0"	20	0.2	Open/A
Crossing Embarcadero south side	East-West Crosswalk	3:30 - 4:30 PM	20' 0"	20' 0"	6	<0.1	Open/A
		6:30 - 7:30 PM	20' 0"	20' 0"	8	<0.1	Open/A
		SAT. 4 - 5 PM	20' 0"	20' 0"	14	0.1	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
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4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Bryant Street/Main Street (crosswalk locations)							
Crossing Bryant Street east side	North-South Crosswalk	3:30 - 4:30 PM	10' 0"	10' 0"	41	0.1	Open/A
		6:30 - 7:30 PM	10' 0"	10' 0"	20	<0.1	Open/A
		SAT. 4 - 5 PM	10' 0"	10' 0"	13	<0.1	Open/A
Crossing Bryant Street west side	North-South Crosswalk	3:30 - 4:30 PM	10' 0"	10' 0"	25	<0.1	Open/A
		6:30 - 7:30 PM	10' 0"	10' 0"	17	<0.1	Open/A
		SAT. 4 - 5 PM	10' 0"	10' 0"	9	<0.1	Open/A
Crossing Main Street north side	East-West Crosswalk	3:30 - 4:30 PM	10' 0"	10' 0"	23	<0.1	Open/A
		6:30 - 7:30 PM	10' 0"	10' 0"	29	<0.1	Open/A
		SAT. 4 - 5 PM	10' 0"	10' 0"	12	<0.1	Open/A
Second Street/King Street (crosswalk locations)							
Crossing Second Street north side	East-West Crosswalk	3:30 - 4:30 PM	17' 5"	17' 5"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	17' 5"	17' 5"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	17' 5"	17' 5"	NA/UC[4]		NA/UC[4]
Crossing King Street east side	North-South Crosswalk	3:30 - 4:30 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]
Crossing King Street west side	North-South Crosswalk	3:30 - 4:30 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	20' 0"	20' 0"	NA/UC[4]		NA/UC[4]

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Second Street/Townsend Street (crosswalk locations)							
Crossing Townsend Street east side	North-South Crosswalk	3:30 - 4:30 PM	7' 6"	7' 6"	27	0.3	Open/A
		6:30 - 7:30 PM	7' 6"	7' 6"	21	0.2	Open/A
		SAT. 4 - 5 PM	7' 6"	7' 6"	22	0.2	Open/A
Crossing Townsend Street west side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	58	0.5	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	21	0.2	Open/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	11	0.1	Open/A
Second Street/Bryant Street (crosswalk locations)							
Crossing Bryant Street east side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	125	0.9	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	96	1.1	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	44	0.5	Open/A
Crossing Bryant Street west side	North-South Crosswalk	3:30 - 4:30 PM	7' 6"	7' 6"	122	1.0	Unimpeded/A
		6:30 - 7:30 PM	7' 6"	7' 6"	96	1.2	Unimpeded/A
		SAT. 4 - 5 PM	7'6"	7' 6"	56	0.7	Unimpeded/A
Second Street/Harrison Street (crosswalk locations)							
Crossing Harrison Street east side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	135	1.0	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	118	1.0	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	40	0.4	Open/A
Crossing Harrison Street west side	North-South Crosswalk	3:30 - 4:30 PM	9' 0"	9' 0"	166	1.1	Unimpeded/A
		6:30 - 7:30 PM	9' 0"	9' 0"	99	0.8	Unimpeded/A
		SAT. 4 - 5 PM	9' 0"	9' 0"	35	0.3	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Second Street/Folsom Street (crosswalk locations)							
Crossing Folsom Street east side	North-South Crosswalk	3:30 - 4:30 PM	8' 4"	8' 4"	259	3.0	Impeded/A
		6:30 - 7:30 PM	8' 4"	8' 4"	201	2.7	Impeded/A
		SAT. 4 - 5 PM	8' 4"	8' 4"	46	0.6	Unimpeded/A
Crossing Folsom Street west side	North-South Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	240	1.8	Unimpeded/A
		6:30 - 7:30 PM	13' 0"	13' 0"	111	0.9	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	44	0.4	Open/A
Second Street/Mission Street (crosswalk locations)							
Crossing Mission Street east side	North-South Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	529	3.1	Impeded/A
		6:30 - 7:30 PM	13' 0"	13' 0"	280	1.8	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	152	1.0	Unimpeded/A
Crossing Mission Street west side	North-South Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	502	2.9	Impeded/A
		6:30 - 7:30 PM	13' 0"	13' 0"	176	1.1	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	149	1.0	Unimpeded/A
Third Street/Townsend Street (crosswalk locations)							
Crossing Townsend Street east side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	74	0.7	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	48	0.5	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	108	1.0	Unimpeded/A
Crossing Townsend Street west side	North-South Crosswalk	3:30 - 4:30 PM	7' 10"	7' 10"	102	1.0	Unimpeded/A
		6:30 - 7:30 PM	7' 10"	7' 10"	90	0.9	Unimpeded/A
		SAT. 4 - 5 PM	7' 10"	7' 10"	74	0.7	Unimpeded/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Third Street/Bryant Street (crosswalk locations)							
Crossing Bryant Street east side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	139	1.3	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	101	1.2	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	64	0.8	Unimpeded/A
Crossing Bryant Street west side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	102	1.0	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	78	0.9	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	38	0.5	Open/A
Third Street/Harrison Street (crosswalk locations)							
Crossing Harrison Street east side	North-South Crosswalk	3:30 - 4:30 PM	9' 6"	9' 6"	139	1.0	Unimpeded/A
		6:30 - 7:30 PM	9' 6"	9' 6"	105	0.8	Unimpeded/A
		SAT. 4 - 5 PM	9' 6"	9' 6"	14	0.1	Open/A
Crossing Harrison Street west side	North-South Crosswalk	3:30 - 4:30 PM	8' 0"	8' 0"	214	1.9	Unimpeded/A
		6:30 - 7:30 PM	8' 0"	8' 0"	122	1.1	Unimpeded/A
		SAT. 4 - 5 PM	8' 0"	8' 0"	27	0.2	Open/A
Third Street/Folsom Street (crosswalk locations)							
Crossing Folsom Street east side	North-South Crosswalk	3:30 - 4:30 PM	9' 0"	9' 0"	474	6.8	Constrained/B
		6:30 - 7:30 PM	9' 0"	9' 0"	258	1.6	Unimpeded/A
		SAT. 4 - 5 PM	9' 0"	9' 0"	235	1.5	Unimpeded/A
Crossing Folsom Street west side	North-South Crosswalk	3:30 - 4:30 PM	13' 0"	13' 0"	53	0.5	Unimpeded/A
		6:30 - 7:30 PM	13' 0"	13' 0"	145	0.6	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	13' 0"	151	0.6	Unimpeded/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
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TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Third Street/Mission Street (crosswalk locations)							
Crossing Mission Street east side	North-South Crosswalk	3:30 - 4:30 PM	10' 0"	10' 0"	620	4.1	Impeded/A
		6:30 - 7:30 PM	10' 0"	10' 0"	246	1.2	Unimpeded/A
		SAT. 4 - 5 PM	10' 0"	10' 0"	487	2.5	Impeded/A
Crossing Mission Street west side	North-South Crosswalk	3:30 - 4:30 PM	15' 4"	15' 4"	410	1.8	Unimpeded/A
		6:30 - 7:30 PM	15' 4"	15' 4"	277	0.9	Unimpeded/A
		SAT. 4 - 5 PM	15' 4"	15' 4"	382	1.3	Unimpeded/A
Ball Park/The Embarcadero (sidewalk locations)							
1. Eastside of The Embarcadero between Ballpark and Townsend	North-South Promenade	3:30 - 4:30 PM	15' 0"	7' 0"	69	0.2	Open/A
		6:30 - 7:30 PM	15' 0"	7' 0"	116	0.3	Open/A
		SAT. 4 - 5 PM	15' 0"	7' 0"	220	0.5	Unimpeded/A
2. Westside of The Embarcadero between 2nd/Townsend	North-South Sidewalk	3:30 - 4:30 PM	15' 0"	7' 0"	19	<0.1	Open/A
		6:30 - 7:30 PM	15' 0"	7' 0"	70	0.2	Open/A
		SAT. 4 - 5 PM	15' 0"	7' 0"	108	0.3	Open/A
King Street Sidewalks (sidewalk locations)							
3. Between Second Street and Third Street north side	East-West Sidewalk	3:30 - 4:30 PM	14' 0"	4' 0"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	14' 0"	4' 0"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	14' 0"	4' 0"	NA/UC[4]		NA/UC[4]
4. Between Second Street and Third Street south side	East-West Sidewalk	3:30 - 4:30 PM	17' 0"	7' 6"	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	17' 0"	7' 6"	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	17' 0"	7' 6"	NA/UC[4]		NA/UC[4]

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
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TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
5. Between Third Street and Fourth Street north side	East-West Sidewalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
6. Between Third Street and Fourth Street south side	East-West Sidewalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
7. Between Fourth Street and Fifth Street north side	East-West Sidewalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
8. Between Fourth Street and Fifth Street south side	East-West Sidewalk	3:30 - 4:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		6:30 - 7:30 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
		SAT. 4 - 5 PM	NA/UC	NA/UC	NA/UC[4]		NA/UC[4]
Third Street Sidewalks (sidewalk locations)							
9. Between King Street and Lefty O'Doul Bridge east side	North-South Sidewalk	3:30 - 4:30 PM	None	None	50	0.3	N/A
		6:30 - 7:30 PM	None	None	35	0.1	N/A
		SAT. 4 - 5 PM	None	None	20	<0.1	N/A
10. Between King Street and Lefty O'Doul Bridge west side	North-South Sidewalk	3:30 - 4:30 PM	10' 0"	3' 0"	66	0.4	Open/A
		6:30 - 7:30 PM	10' 0"	3' 0"	53	0.2	Open/A
		SAT. 4 - 5 PM	10' 0"	3' 0"	1	<0.1	Open/A
11. Lefty O'Doul Bridge east side	North-South Sidewalk	3:30 - 4:30 PM	5' 6"	3' 6"	10	<0.1	Open/A
		6:30 - 7:30 PM	5' 6"	3' 6"	15	0.1	Open/A
		SAT. 4 - 5 PM	5' 6"	5' 6"	13	0.1	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Third Street Sidewalks (sidewalk locations - continued)							
12. Lefty O'Doul Bridge west side	North-South Sidewalk	3:30 - 4:30 PM	4' 6"	2' 6"	15	0.1	Open/A
		6:30 - 7:30 PM	4' 6"	2' 6"	12	0.1	Open/A
		SAT. 4 - 5 PM	4' 6"	2' 6"	2	<0.1	Open/A
13. Between Bridge and Fourth Street east side	North-South Sidewalk	3:30 - 4:30 PM	4' 0"	4' 0"	15	0.1	Open/A
		6:30 - 7:30 PM	4' 0"	4' 0"	11	<0.1	Open/A
		SAT. 4 - 5 PM	4' 0"	4' 0"	0	<0.1	Open/A
14. Between Bridge and Fourth Street west side	North-South Sidewalk	3:30 - 4:30 PM	None	None	10	<0.1	N/A
		6:30 - 7:30 PM	None	None	4	<0.1	N/A
		SAT. 4 - 5 PM	None	None	12	<0.1	N/A
15. South of Fourth Street east side	North-South Sidewalk	3:30 - 4:30 PM	10' 0"	4' 0"	7	<0.1	Open/A
		6:30 - 7:30 PM	10' 0"	4' 0"	6	<0.1	Open/A
		SAT. 4 - 5 PM	10' 0"	4' 0"	84	0.4	Open/A
16. South of Fourth Street west side	North-South Sidewalk	3:30 - 4:30 PM	9' 0"	3' 0"	0	<0.1	Open/A
		6:30 - 7:30 PM	9' 0"	3' 0"	4	<0.1	Open/A
		SAT. 4 - 5 PM	9' 0"	3' 0"	15	0.1	Open/A
17. Between King and Townsend Streets east side	North-South Sidewalk	3:30 - 4:30 PM	13' 0"	3' 6"	63	0.3	Open/A
		6:30 - 7:30 PM	13' 0"	3' 6"	109	0.5	Unimpeded/A
		SAT. 4 - 5 PM	13' 0"	3' 6"	106	0.5	Unimpeded/A
18. Between King and Townsend Streets west side	North-South Sidewalk	3:30 - 4:30 PM	N/A	N/A	21	<0.1	N/A
		6:30 - 7:30 PM	N/A	N/A	14	<0.1	N/A
		SAT. 4 - 5 PM	N/A	N/A	2	<0.1	N/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Third Street Sidewalks (sidewalk locations - continued)							
19. Between Brannan and Townsend Streets east side	North-South Sidewalk	3:30 - 4:30 PM	10' 0"	2' 6"	128	0.9	Unimpeded/A
		6:30 - 7:30 PM	10' 0"	2' 6"	128	0.9	Unimpeded/A
		SAT. 4 - 5 PM	10' 0"	2' 6"	212	1.4	Unimpeded/A
20. Between Brannan and Townsend Streets west side	North-South Sidewalk	3:30 - 4:30 PM	9' 6"	2' 6"	102	0.7	Unimpeded/A
		6:30 - 7:30 PM	9' 6"	2' 6"	102	0.7	Unimpeded/A
		SAT. 4 - 5 PM	9' 6"	2' 6"	135	0.9	Unimpeded/A
Peter Maloney Bridge Sidewalks (sidewalk locations)							
21. Peter Maloney Bridge east side	North-South Sidewalk	3:30 - 4:30 PM	6' 0"	6' 0"	47	0.1	Open/A
		6:30 - 7:30 PM	6' 0"	6' 0"	25	0.1	Open/A
		SAT. 4 - 5 PM	6' 0"	6' 0"	24	0.1	Open/A
22. Peter Maloney Bridge west side	North-South Sidewalk	3:30 - 4:30 PM	6' 0"	6' 0"	48	0.1	Open/A
		6:30 - 7:30 PM	6' 0"	6' 0"	16	<0.1	Open/A
		SAT. 4 - 5 PM	6' 0"	6' 0"	68	0.2	Open/A
Second Street Sidewalks (sidewalk locations)							
23. Between King and Townsend Streets east side	North-South Sidewalk	3:30 - 4:30 PM	13' 0"	3' 6"	30	0.1	Open/A
		6:30 - 7:30 PM	13' 0"	3' 6"	20	0.1	Open/A
		SAT. 4 - 5 PM	13' 0"	3' 6"	12	0.1	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

TABLE X.C.6
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING CONDITIONS
San Francisco Giants Ballpark at China Basin - Background Transportation Report

Location	Orientation/ Type of Facility	Study Time Period	Width (feet)	Effective Width (feet)[1]	Vol (pph)[2]	Flow Rate[3]	Flow Regime LOS
Second Street Sidewalks (sidewalk locations - continued)							
24. Between King and Townsend Streets west side	North-South Sidewalk	3:30 - 4:30 PM	N/A	N/A	35	0.1	N/A
		6:30 - 7:30 PM	N/A	N/A	19	<0.1	N/A
		SAT. 4 - 5 PM	N/A	N/A	18	<0.1	N/A
25. Between Brannan and Townsend Streets east side	North-South Sidewalk	3:30 - 4:30 PM	10' 0"	2' 6"	54	0.4	Open/A
		6:30 - 7:30 PM	10' 0"	2' 6"	37	0.2	Open/A
		SAT. 4 - 5 PM	10' 0"	2' 6"	17	0.1	Open/A
26. Between Brannan and Townsend Streets west side	North-South Sidewalk	3:30 - 4:30 PM	9' 6"	2' 6"	38	0.3	Open/A
		6:30 - 7:30 PM	9' 6"	2' 6"	28	0.2	Open/A
		SAT. 4 - 5 PM	9' 6"	2' 6"	9	0.1	Open/A

Notes:
NA/UC = Not available, under construction.
1. Sidewalks only; less 3.0 feet for buffer plus existing obstructions.
2. Pedestrians per hour (pph)
3. Pedestrians per minute per foot of width (ppmpf), includes consideration of signal timing.
4. Construction detours affect pedestrian flow.
5. Location Code (see Figure 2-16).

Source: Wilbur Smith Associates.

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

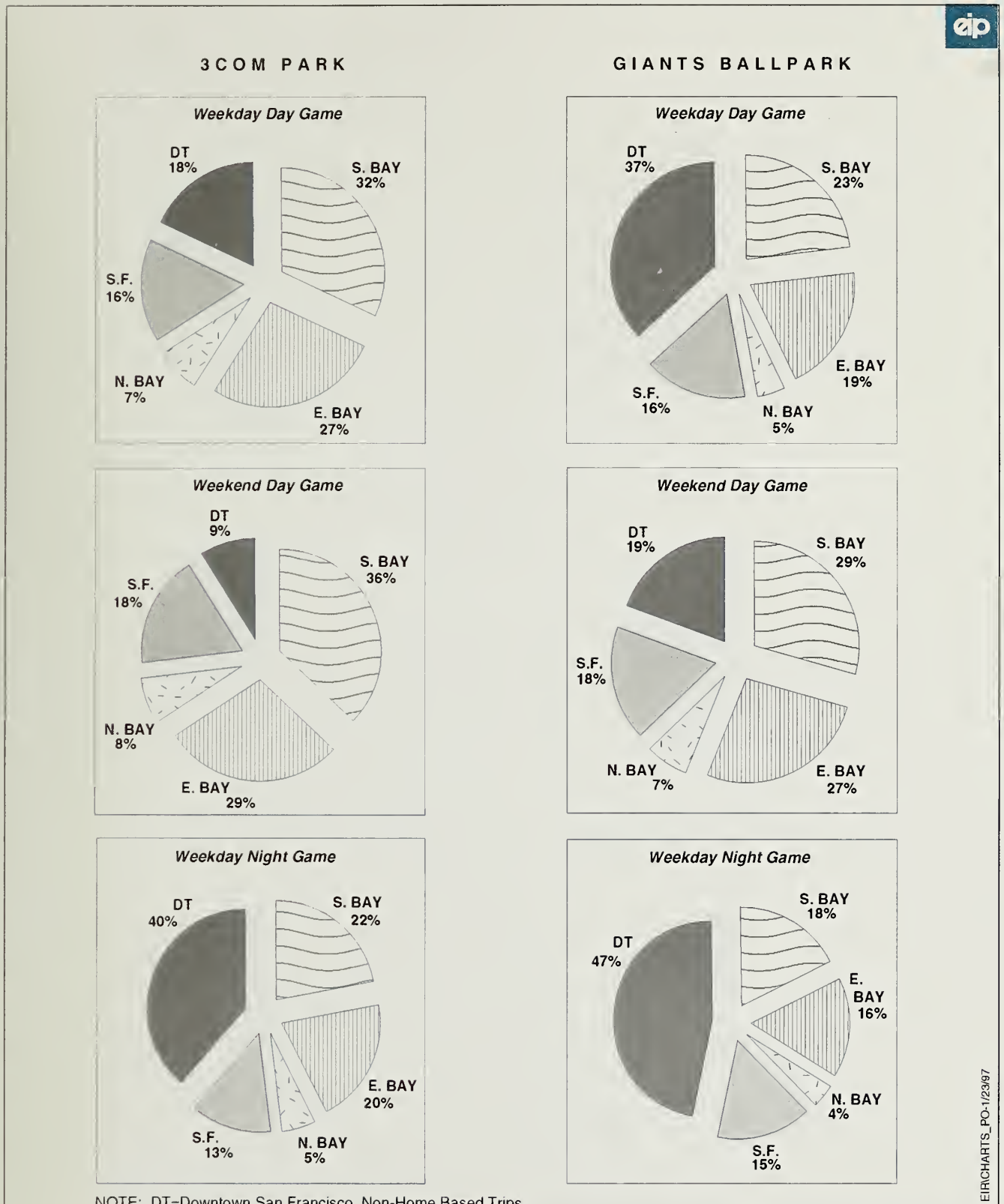
Figure X.C.2 Pedestrian Study Locations

TABLE X.C.7
CHARACTERISTICS OF PEDESTRIAN FLOW

Quality of Flow	Conflicts	Sq. Ft. per Person	Flow Rate[1]	Service Levels[2]
Open	None	over 530	Under 0.5	A
Unimpeded	Minor	530 - 130	0.5 - 2	A
Impeded	Some	130 - 40	2 - 6	A
Constrained	50% Probability	40 - 24	6 - 10	B
Crowded	High Probability	24 - 16	10 - 14	C
Congested	Unavoidable	16 - 11	14 - 18	*
Jammed	Unavoidable	2 - 11	0 - 25	*

Notes:
*Exceeds design capacity for pedestrian areas.
1. Flow Rate, persons per minute per foot of walkway width.
2. Fruin, *Designing for Pedestrians*.

Source: Pushkarev and Zupan, *Urban Space for Pedestrians*, Tables 3-6 & 3-7 MIT Press, 1975.
Wilbur Smith Associates.

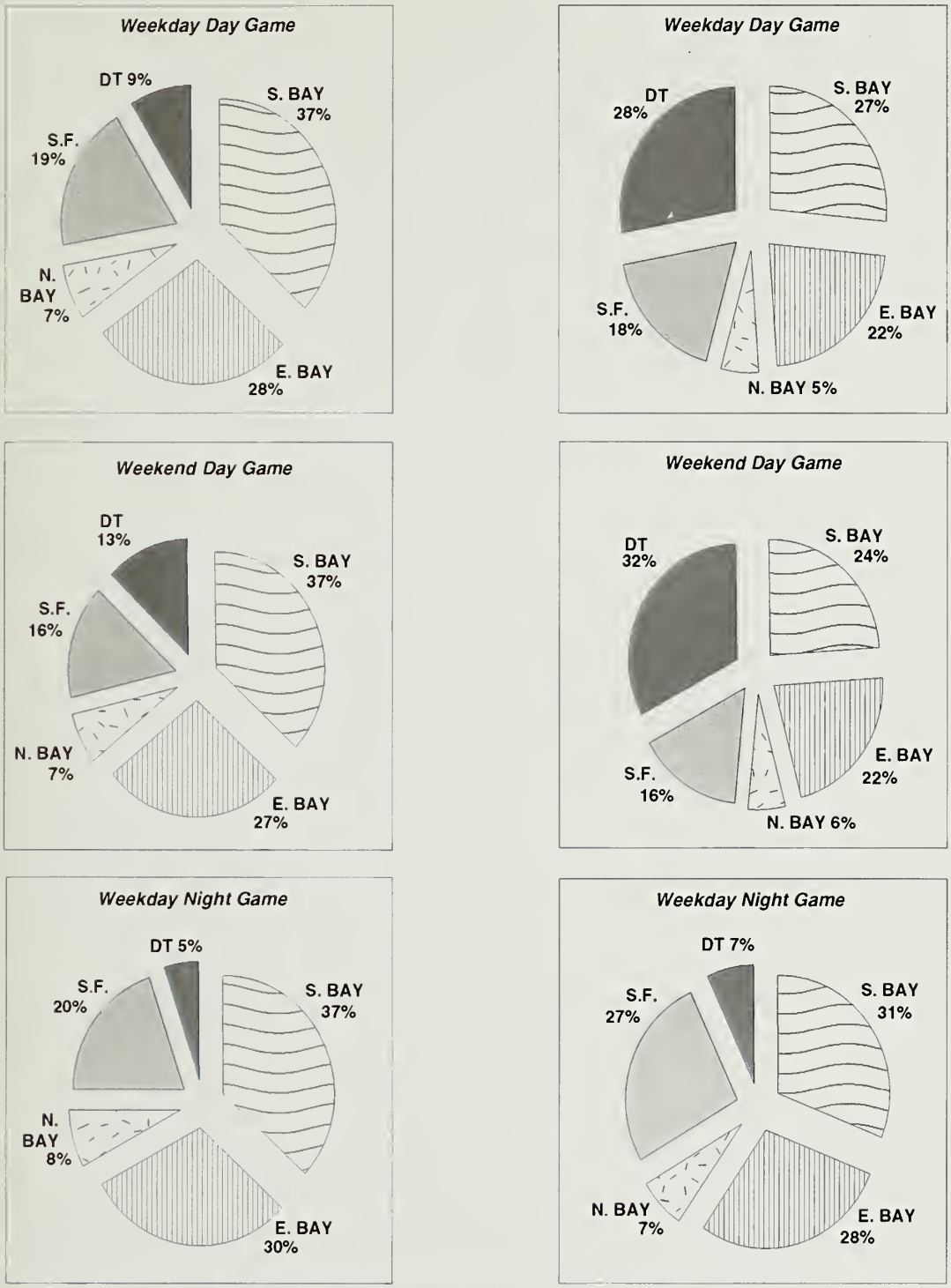


NOTE: DT=Downtown San Francisco, Non-Home Based Trips

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

Figure X.C.3 Trip Origins of Ballgame Attendees



NOTE: DT=Downtown San Francisco, Non-Home Based Trips

EIR\CHARTS_PO-1/23/97

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

Figure X.C.4 Post-Game Destinations of Ballgame Attendees

TABLE X.C.8
AVERAGE AUTO OCCUPANCY RATES

Location	Survey Date	Persons per Vehicle
Giants Ballpark Assumptions	Weekday - arrival/departure	2.70
	Weeknight - arrival	2.70
	- departure	2.80
	Weekend - arrival/departure	2.90
3Com Park - Giants Game[1]	Wednesday, June 19 before weeknight game	2.51
	Saturday, June 29 after weekend day game	2.53
	Sunday, June 16 after weekend day game	2.60
Coors Field Traffic Study[2]	Study published August 1994	2.75
Fenway Park in Boston[3]	August 25, 1979	3.30
San Diego Jack Murphy Stadium[4]	September 8, 1989	2.40
	September 9, 1989	2.60
Anaheim (California Angeles)[5]	Before 1975	3.41
Dodger Stadium[5]	Before 1975	2.60
Fulton County Stadium[5] Atlanta Braves	Before 1975	3.00

Notes:
1. WSA Survey, June 1996.
2. Coors Field Traffic Study, 1994.
3. Fenway Park Mode of Access Study, 1978
4. WSA Traffic Study, 1989.
5. Weant & Levinson, 1990.

Source: Wilbur Smith Associates.

TABLE X.C.10
TRIP GENERATION BY LAND USE
USCF/Mission Bay Development - South of China Basin Channel
Weekday P.M. Peak Hour *(3:30 - 4:30 PM and 4:30 - 5:30 PM)*

Land Use	Size	Daily Trip Rate	PM Peak Hour Person Trips	PM Peak Hour Vehicle Trips	PM Peak Hour TransitTrips
Commercial/Light Industrial	Office = 2.5 MSF (8,635 employees)[1]	5.0/Employee[4]	3,670	1,782	644
	Industrial = 2.5 MSF (6,170 employees)[2]	4.5/Employee[5]	3,443	1,555	564
Hotel	500 Rooms (370 employees)[3]	17.9/Employee	365	148	54
Retail/Entertainment	200 KSF	150/ksf	1,200	392	145
Neighborhood Retail	150 KSF	150/ksf	900	294	108
Housing	Small Units = 1,000 DU.	7.5/DU	1,298	602	286
	Large Units = 2,000 DU.	10.0/DU	3,460	1,607	765
UCSF		N/A	2,754	1,622[6]	648[6]
Total:			**17,090**	**8,002**	**3,214**

Notes:

1. Assumed 289.5 gsf per employee, Mission Bay EIR
2. Assumed 405 gsf per employee, Mission Bay EIR
3. Assumed 0.74 employees per room, Mission Bay EIR
4. Assumed trip generation rate for "Other office", SF Guidelines
5. Assumed trip generation rate for "Manufacturing", SF Guidelines
6. Source = UCSF Long Range Development Plan Final EIR, January 1997.

Source: Wilbur Smith Associates

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

Figure X.C.5 Project Auto Trip Distribution
Weekday Afternoon Post-Game Scenario (3:30 - 4:30 P.M.)

SOURCE: Wilbur Smith Associates

GIANTS BALLPARK

Figure X.C.6 Project Auto Trip Distribution
Weekday Night Pre-Game Scenario (6:30 - 7:30 P.M.)

TABLE X.C.11
PARKING SUPPLY AND DEMAND
EXISTING PLUS PROJECT CONDITIONS
(YEAR 2000)

Parking Demand[1]	Weekday Game		Weekend Game Afternoon
	Afternoon	Night	
Fans	8,050	10,155	10,470
Game-Day Employees	130	115	115
Concessionaires	140	140	140
Ancillary Uses[2]	210	180	180
Parking Demand Subtotal	**8,530**	**10,590**	**10,905**
On-Site Parking Structure	210	210	210
Dedicated Surface Parking	5,000	5,000	5,000
Total Ballpark Parking Supply	**5,210**	**5,210**	**5,210**
Total On-Site Shortfalls	3,320	5,380	5,695
Available (Unoccupied) Spaces	740	7,070	5,920
Parking Surplus/(Shortfalls)	(2,580)	1,690	225

Notes:
1. Parking demand is based on trip generation and mode split data developed by Wilbur Smith Associates.
2. Ancillary uses include the Giants' administrative office, broadcast studio, showcase/learning center, and restaurant.

Sources: Wilbur Smith Associates, Pittman & Hames Associates.

TABLE X.C.12
Parking Spaces to be Removed Due to Future Development

Existing + Project Conditions

Time Category	Block(s)	Total Space	# of Spaces Removed	Comments
10 to 15 min	3768	349	349	Site of future Portside II residential development
15 to 20 min	3744	450	450	Site of proposed Gap project
15 to 20 min	3736 - 3741	2688	1075	Assumes 40% of spaces are removed due to implementation of SFRA Transbay Area Redevelopment Plan.
Total:			1874	
Total 15 min. walk:			*349*	
Total > 15 min. walk:			*1525*	

Year 2015

Time Category	Block(s)	Total Spaces	# of Spaces Removed	Comments
>20 min.	3718	300	300	New Transbay Terminal site. Estimate based on Korve data.
>20 min	3711	641	0	Port property; parking to remain. Estimate based on Korve data.
>20 min	3759	220	0	Parking on Caltrans property underneath Bay Bridge and skyway. Per Caltrans, parking will be maintained even during retrofit construction.
10 to 15 min	3766	375	375	Future Development south of 300 Beale site, between Bay Bridge anchorage.
10 to 15 min	3761 - 3762; 3764 - 3766	1731	0	Parking on Caltrans property underneath Bay Bridge and skyway. Per Caltrans, parking will be maintained even during retrofit construction.
15 to 20 min	3721	856	256	Existing Transbay Terminal site. Per Planning Department, 600 spaces west of 1st St. would remain.
15 to 20 min	3736-3741	2688	1613	Assumes remaining 60% of spaces would be removed due to development under SFRA Transbay Area Redevelopment Plan and construction of new Fremont St. ramps.
15 to 20 min	3760	601	0	Parking on Caltrans property underneath Bay Bridge and skyway. Per Caltrans, parking will be maintained even during retrofit construction.
5 to 10 min	3763	495	0	Parking on Caltrans property underneath Bay Bridge and skyway. Per Caltrans, parking will be maintained even during retrofit construction.
Total Year 2015:			2544	
Total 15 min walk:			*375*	
Total > 15 min walk:			*2169*	

Source: Pittman & Hames Associates.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Intersection	Crosswalk Location	Time Period	Width (feet)	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
3rd St./King St.	Northside	3:30 - 4:30 PM	20	163	1.7	Unimpeded
		6:30 - 7:30 PM	20	112	1.2	Unimpeded
		SAT. 4 - 5 PM	20	106	1.1	Unimpeded
	Southside	3:30 - 4:30 PM	20	8,116	84.5	***
		6:30 - 7:30 PM	20	7,802	81.3	***
		SAT. 4 - 5 PM	20	8,975	93.5	***
	Eastside	3:30 - 4:30 PM	20	3,636	5.8	Impeded
		6:30 - 7:30 PM	20	3,218	5.2	Impeded
		SAT. 4 - 5 PM	20	3,209	5.1	Impeded
	Westside	3:30 - 4:30 PM	20	2,566	4.1	Impeded
		6:30 - 7:30 PM	20	2,033	3.3	Impeded
		SAT. - 4 - 5 PM	20	1,984	3.2	Impeded
4th/Townsend	Northside	3:30 - 4:30 PM	13	83	0.4	Open
		6:30 - 7:30 PM	13	52	0.1	Open
		SAT. 4 - 5 PM	13	11	0.0	Open
	Southside	3:30 - 4:30 PM	8	277	2.4	Impeded
		6:30 - 7:30 PM	8	172	0.8	Unimpeded
		SAT. 4 - 5 PM	8	25	0.1	Open
	Eastside	3:30 - 4:30 PM	14	62	0.2	Open
		6:30 - 7:30 PM	14	27	0.2	Open
		SAT. 4 - 5 PM	14	20	0.1	Open
	Westside	3:30 - 4:30 PM	13	1,421	4.6	Impeded
		6:30 - 7:30 PM	13	872	6.6	Constrained
		SAT. 4 - 5 PM	13	846	6.4	Constrained
4th/King St.	Northside	3:30 - 4:30 PM	20	981	0.8	Unimpeded
		6:30 - 7:30 PM	20	671	0.6	Unimpeded
		SAT. 4 - 5 PM	20	638	0.5	Unimpeded
Embarcadero/Bryant	Westside	3:30 - 4:30 PM	17.3	81	0.2	Open
		6:30 - 7:30 PM	17.3	89	0.3	Open

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Intersection	Crosswalk Location	Time Period	Width (feet)	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
		SAT. 4 - 5 PM	17.3	132	0.4	Open
	Northside	3:30 - 4:30 PM	20	162	1.2	Unimpeded
		6:30 - 7:30 PM	20	179	1.4	Unimpeded
		SAT. 4 - 5 PM	20	263	2.0	Unimpeded
	Southside	3:30 - 4:30 PM	20	162	0.9	Unimpeded
		6:30 - 7:30 PM	20	179	1.0	Unimpeded
		SAT. 4 - 5 PM	20	263	1.5	Unimpeded
Main St./Bryant	Eastside	3:30 - 4:30 PM	10	162	0.3	Open
		6:30 - 7:30 PM	10	179	0.3	Open
		SAT. 4 - 5 PM	10	263	0.4	Open
	Westside	3:30 - 4:30 PM	10	162	0.3	Open
		6:30 - 7:30 PM	10	179	0.3	Open
		SAT. 4 - 5 PM	10	263	0.4	Open
	Northside	3:30 - 4:30 PM	10	81	0.1	Open
		6:30 - 7:30 PM	10	89	0.1	Open
		SAT. 4 - 5 PM	10	132	0.2	Open
2nd St./King	Northside	3:30 - 4:30 PM	20	700	5.8	Impeded
		6:30 - 7:30 PM	20	603	5.0	Impeded
		SAT. 4 - 5 PM	20	820	6.8	Constrained
	Eastside	3:30 - 4:30 PM	20	2,051	15.5	Congested*
		6:30 - 7:30 PM	20	1,674	12.7	Crowded
		SAT. 4 - 5 PM	20	2,117	16.0	Congested*
	Westside	3:30 - 4:30 PM	20	5,462	50.6	***
		6:30 - 7:30 PM	20	4,403	40.8	***
		SAT. 4 - 5 PM	20	4,151	38.4	***
2nd/Townsend	Eastside	3:30 - 4:30 PM	7.5	1,533	7.6	Constrained
		6:30 - 7:30 PM	7.5	1,096	5.1	Impeded
		SAT. 4 - 5 PM	7.5	1,298	6.0	Constrained
	Westside	3:30 - 4:30 PM	8	2,377	11.0	Crowded

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Intersection	Crosswalk Location	Time Period	Width (feet)	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
		6:30 - 7:30 PM	8	1,696	7.4	Constrained
		SAT. 4 - 5 PM	8	1,829	7.9	Constrained
2nd/Bryant	Eastside	3:30 - 4:30 PM	8	1,284	4.7	Impeded
		6:30 - 7:30 PM	8	894	5.0	Impeded
		SAT. 4 - 5 PM	8	1,129	6.4	Constrained
	Westside	3:30 - 4:30 PM	7.5	1,284	5.0	Impeded
		6:30 - 7:30 PM	7.5	894	5.4	Impeded
		SAT. 4 - 5 PM	7.5	1,129	6.8	Constrained
2nd/Harrison	Eastside	3:30 - 4:30 PM	8	1,156	4.4	Impeded
		6:30 - 7:30 PM	8	846	3.9	Impeded
		SAT. 4 - 5 PM	8	1,018	4.7	Impeded
	Westside	3:30 - 4:30 PM	8	1,156	4.4	Impeded
		6:30 - 7:30 PM	8	846	3.9	Impeded
		SAT. 4 - 5 PM	8	1,018	4.7	Impeded
2nd/Folsom	Eastside	3:30 - 4:30 PM	8.3	1,028	5.9	Impeded
		6:30 - 7:30 PM	8.3	798	5.3	Impeded
		SAT. 4 - 5 PM	8.3	907	6.1	Constrained
	Westside	3:30 - 4:30 PM	13	1,028	3.8	Impeded
		6:30 - 7:30 PM	13	798	3.4	Impeded
		SAT. 4 - 5 PM	13	907	3.9	Impeded
2nd/Mission	Eastside	3:30 - 4:30 PM	13	553	3.2	Impeded
		6:30 - 7:30 PM	13	542	3.5	Impeded
		SAT. 4 - 5 PM	13	546	3.5	Impeded
	Westside	3:30 - 4:30 PM	13	553	3.2	Impeded
		6:30 - 7:30 PM	13	542	3.5	Impeded
		SAT. 4 - 5 PM	13	546	3.5	Impeded
3rd/Townsend	Eastside	3:30 - 4:30 PM	8	1,401	6.8	Constrained
		6:30 - 7:30 PM	8	1,673	8.1	Constrained

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Intersection	Crosswalk Location	Time Period	Width (feet)	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
		SAT. 4 - 5 PM	8	1,749	8.5	Constrained
	Westside	3:30 - 4:30 PM	7.8	600	3.0	Impeded
		6:30 - 7:30 PM	7.8	717	3.6	Impeded
		SAT. 4 - 5 PM	7.8	750	3.7	Impeded
3rd/Bryant	Eastside	3:30 - 4:30 PM	8	1,620	7.8	Constrained
		6:30 - 7:30 PM	8	1,834	10.9	Crowded
		SAT. 4 - 5 PM	8	1,889	11.2	Crowded
	Westside	3:30 - 4:30 PM	8	819	4.0	Impeded
		6:30 - 7:30 PM	8	878	5.2	Impeded
		SAT. 4 - 5 PM	8	890	5.3	Impeded
3rd/Harrison	Eastside	3:30 - 4:30 PM	9.5	1,420	5.2	Impeded
		6:30 - 7:30 PM	9.5	1,595	6.1	Constrained
		SAT. 4 - 5 PM	9.5	1,639	6.3	Constrained
	Westside	3:30 - 4:30 PM	8	819	3.6	Impeded
		6:30 - 7:30 PM	8	878	4.0	Impeded
		SAT. 4 - 5 PM	8	890	4.0	Impeded
3rd/Folsom	Eastside	3:30 - 4:30 PM	9	1,219	17.4	Congested*
		6:30 - 7:30 PM	9	1,356	8.4	Constrained
		SAT. 4 - 5 PM	9	1,389	8.6	Constrained
	Westside	3:30 - 4:30 PM	13	819	8.1	Constrained
		6:30 - 7:30 PM	13	878	3.8	Impeded
		SAT. 4 - 5 PM	13	890	3.8	Impeded
3rd/Mission	Eastside	3:30 - 4:30 PM	10	400	2.7	Impeded
		6:30 - 7:30 PM	10	478	2.4	Impeded
		SAT. 4 - 5 PM	10	500	2.5	Impeded
	Westside	3:30 - 4:30 PM	15.3	200	0.9	Unimpeded
		6:30 - 7:30 PM	15.3	239	0.8	Unimpeded
		SAT. 4 - 5 PM	15/3	250	0.8	Unimpeded

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Study Location	Time Period	Eastside Westside	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
King Street:	3:30 - 4:30 PM	7	1,137	2.7	Impeded
Embarcadero to 2nd St.	6:30 - 7:30 PM	7	1,252	3.0	Impeded
southside	SAT. 4 - 5 PM	7	1,842	4.4	Impeded
King Street:	3:30 - 4:30 PM	7	518	1.2	Unimpeded
Embarcadero to 2nd St.	6:30 - 7:30 PM	7	578	1.4	Unimpeded
northside	SAT. 4 - 5 PM	7	819	1.9	Unimpeded
King Street:	3:30 - 4:30 PM	4	757	3.2	Impeded
2nd St. to 3rd St.	6:30 - 7:30 PM	4	651	2.7	Impeded
northside	SAT. 4 - 5 PM	4	668	2.8	Impeded
King Street:	3:30 - 4:30 PM	7.6	14,958	32.8	***
2nd St. to 3rd St.	6:30 - 7:30 PM	7.6	14,143	31.0	***
southside	SAT. 4 - 5 PM	7.6	15,228	33.4	***
King Street:	3:30 - 4:30 PM	12	2,774	3.9	Impeded
3rd St. to 4th St.	6:30 - 7:30 PM	12	2,198	3.1	Impeded
northside	SAT. 4 - 5 PM	12	1,953	2.7	Impeded
3rd Street:	3:30 - 4:30 PM	7	4,398	10.5	Crowded
Berry to China Basin	6:30 - 7:30 PM	7	4,918	11.7	Crowded
eastside	SAT. 4 - 5 PM	7	6,228	14.8	Congested*
3rd Street:	3:30 - 4:30 PM	3	4,398	24.4	Jammed**
Berry to China Basin	6:30 - 7:30 PM	3	4,918	27.3	***
westside	SAT. 4 - 5 PM	3	6,228	34.6	***
3rd Street:	3:30 - 4:30 PM	3.5	4,186	19.9	Jammed**
Lefty O'Doul Bridge	6:30 - 7:30 PM	3.5	4,671	22.2	Jammed**
eastside	SAT. 4 - 5 PM	3.5	6,011	28.6	***
3rd Street:	3:30 - 4:30 PM	2.5	4,186	27.9	***
Lefty O'Doul Bridge	6:30 - 7:30 PM	2.5	4,671	31.1	***
westside	SAT. 4 - 5 PM	2.5	6,011	40.1	***

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Study Location	Time Period	Eastside Westside	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
3rd Street:	3:30 - 4:30 PM	7	4,186	10.0	Constrained
Bridge to 4th St	6:30 - 7:30 PM	7	4,671	11.1	Crowded
eastside	SAT. 4 - 5 PM	7	6,011	14.3	Congested*
3rd Street:	3:30 - 4:30 PM	7	4,186	10.0	Constrained
Bridge to 4th St	6:30 - 7:30 PM	7	4,671	11.1	Crowded
westside	SAT. 4 - 5 PM	7	6,011	14.3	Congested*
3rd Street:	3:30 - 4:30 PM	4	425	1.8	Unimpeded
4th to 16th St.	6:30 - 7:30 PM	4	494	2.1	Impeded
eastside	SAT. 4 - 5 PM	4	435	1.8	Unimpeded
3rd Street:	3:30 - 4:30 PM	3	425	2.4	Impeded
4th to 16th St.	6:30 - 7:30 PM	3	494	2.7	Impeded
westside	SAT. 4 - 5 PM	3	435	2.4	Impeded
3rd Street:	3:30 - 4:30 PM	3.5	3,423	16.3	Congested*
King - Townsend St.	6:30 - 7:30 PM	3.5	3,072	14.6	Congested*
eastside	SAT. 4 - 5 PM	3.5	3,011	14.3	Congested*
3rd Street:	3:30 - 4:30 PM	7	1,748	4.2	Impeded
King - Townsend St.	6:30 - 7:30 PM	7	1,474	3.5	Impeded
westside	SAT. 4 - 5 PM	7	1,452	3.5	Impeded
3rd Street:	3:30 - 4:30 PM	2.5	1,838	12.3	Crowded
Townsend - Brannan St.	6:30 - 7:30 PM	2.5	1,994	13.3	Crowded
eastside	SAT. 4 - 5 PM	2.5	2,029	13.5	Crowded
3rd Street:	3:30 - 4:30 PM	4.5	1,038	3.8	Impeded
Townsend - Brannan St.	6:30 - 7:30 PM	4.5	1,038	3.8	Impeded
westside	SAT. 4 - 5 PM	4.5	1,029	3.8	Impeded
4th Street:	3:30 - 4:30 PM	6	2,502	7.0	Constrained
Bridge	6:30 - 7:30 PM	6	2,453	6.8	Constrained
eastside	SAT. 4 - 5 PM	6	3,204	8.9	Constrained

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

TABLE X.C.13
PEDESTRIAN VOLUMES AND OPERATIONS ANALYSIS - EXISTING + PROJECT

Study Location	Time Period	Eastside Westside	Volume (pph)	Flow Rate (ppmpf)	Flow Regime
4th Street:	3:30 - 4:30 PM	6	2,502	7.0	Constrained
Bridge	6:30 - 7:30 PM	6	2,453	6.8	Constrained
westside	SAT. 4 - 5 PM	6	3,204	8.9	Constrained
2nd Street:	3:30 - 4:30 PM	7	2,438	5.8	Impeded
King - Townsend St.	6:30 - 7:30 PM	7	1,779	4.2	Impeded
eastside	SAT. 4 - 5 PM	7	1,887	4.5	Impeded
2nd Street:	3:30 - 4:30 PM	7	1,502	3.6	Impeded
King - Townsend St.	6:30 - 7:30 PM	7	1,055	2.5	Impeded
westside	SAT. 4 - 5 PM	7	1,269	3.0	Impeded
2nd Street:	3:30 - 4:30 PM	3.5	1,533	7.3	Constrained
Townsend - Brannan St.	6:30 - 7:30 PM	3.5	1,096	5.2	Impeded
eastside	SAT. 4 - 5 PM	3.5	1,298	6.2	Constrained
2nd Street:	3:30 - 4:30 PM	5	1,502	5.0	Impeded
Townsend - Brannan St.	6:30 - 7:30 PM	5	1,055	3.5	Impeded
westside	SAT. 4 - 5 PM	5	1,269	4.2	Impeded

Notes:
1. Less 3.0 feet for buffer plus existing obstructions.
ppmpf = Pedestrians per minute per foot of width.
pph = Pedestrians per hour.
* = Congested (worse than LOS C). Improvement measures required.
** = Jammed (worse than LOS C). Improvement measures required.
*** = Exceeds theoretical capacity.

Source: Wilbur Smith Associates.

TABLE X.C.14
SURVEY OF BICYCLE PARKING DEMAND AND FACILITIES AT SPORTS STADIA

	Denver-Coors Stadium Rockies Games[1]	Seattle Kingdome Mariner Games[2]	Stanford Stadium Football Games[3]
Attendance Statistics			
► Capacity	50,000	59,166	85,000
► Average Peak Attendance	50,000 / 50,000	33,000 / NA	40,000 / 80,000
Bike Parking Characteristics			
► Number of Spaces Provided	200	20	Unlimited
► Peak Demand	130	100[4]	1,026
► Security	Unguarded. Racks within fenced area.	Unguarded. Racks in north parking lot[5]	Guarded racks within three corrals.
Auto Parking Characteristics			
► Fee	$5.00	$5.00	Free
► Number of Spaces	5,500	4,100	N/A
Promotional Efforts	Bike routes included in transportation brochures for stadium.	None specifically for Kingdome	Press releases, PA during games.

Notes:
1. Phone conversation with Dave Moore, Colorado Rockies and Lee Keller, BRW Engineering, Denver, CO, July 18, 1996.
2. Phone conversation with Gene Willard, Kingdome maintenance, July 18, 1996.
3. Phone conversation with Ellen Fletcher, Parking Coordinator, Silicon Valley Bicycle Coalition, July 17, 1996. John Ciccarelli, Stanford University Bicycle Program Manager, July 18, 1996; Receptionist, Athletic Department, July 18, 1996.
4. This is an estimate. Parked bikes have never been counted.
5. Due to significant overflow problem, bikes are locked to barricades, poles, trees, etc. More racks will soon be provided in South Lot.

Source: Wilbur Smith Associates

TABLE X.C.15
SUMMARY OF PROJECT CONSTRUCTION TRUCK OPERATIONS

Construction Phase	Demolition	Foundation	Super-Structure	Finish
Duration of Construction (months)	4.5	8	9	12
Average Number of Daily Truck Trips	100	50	50	44
Peak Number of Truck Trips (one-way) per Day - Possible	150	80	80	70
Percentage of Total Daily Truck Traffic between 4:00 & 6:00 PM	0%	15%	15%	0%
Estimated Number of Trucks (peak) between 4:00 & 6:00 PM	-0-	12	12	-0-
Average Size of Trucks[1]	12 Yd	9 Yd	9 Yd	Semi/Flatbed
Daily Truck Traffic Hours of Operations	6:00 AM to 6:00 PM			
Construction Staging Location	On-Site			
Location of Truck Loading/Unloading	On-Site			
Truck Route #1	To I-280 South from job-site, left on King, from 2nd or 3rd Streets to, 5th Street - I-280 South Ramp.			
Truck Route #2	To I-80 East from job site, 3rd Street turn left on Brannan, right on 6th Street, right on Bryant, left on 5th Street right onto I-80 East.			

Notes:
Assumes no major site excavation and removal.
1. Yd = Cubic yards

Source: Kajima Corporation, Project Construction Management. Wilbur Smith Associates.

D. NOISE

SOME BASIC ENVIRONMENTAL NOISE CONCEPTS

Sound is a form of energy transmitted via atmospheric pressure variations. Its most obvious characteristics are amplitude, which we perceive as loudness, and frequency, which we experience as pitch. The standard unit of sound amplitude is the **decibel** (dB). Most common sounds contain many different frequency components. Because the human ear is not equally sensitive to all frequencies, a frequency-dependent weighting scheme is imposed whenever sound is measured. **A-weighted decibels** (dBAs) handle a sound's frequency components in a manner approximating that of the human ear. Table X.D.1 provides examples of the A-weighted sound levels associated with common situations.

The judgment of the listener is crucial in discriminating between sound and noise; **noise** is simply sound that is unacceptable to the listener for a variety of reasons. Intense noise, as it is experienced in certain industrial and commercial settings (e.g. steel mills, airports, etc.), can cause physiological damage. In most instances of environmental exposure, noise effects are typically limited to subjective effects such as annoyance or dissatisfaction, interference with sleep, speech, recreation, and work performance. Unfortunately, there is no completely satisfactory way to measure subjective effects, primarily because of the wide variation in individual thresholds of annoyance, and in individual habituation to noise based on past experience. Surveys allow the establishment of criteria that reflect the range of community responses to noise and changes in noise level.

Many quantitative indicators have been developed to measure environmental noise. All reflect the consensus among researchers that there is a correlation between the adverse impacts of noise and its loudness. Some indicators consider the time of noise occurrence. Three of the commonly used indicators that have been used in this analysis of the environmental noise impacts of the proposed ballpark are:

TABLE X.D.1
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

A-Weighted Sound Level in Decibels	Noise Environments and Sources	Subjective Impression
140		
130	100' From a Civil Defense Siren	
120	200' From a Jet Takeoff	Pain Threshold
110	In Rock Music Concert Hall	
100	50' From a Pile Driver or 100' From an Ambulance Siren	Very Loud
90	Boiler Room or 50' From Freight Cars	
80	In Kitchen with Garbage Disposal Running or 50' From a Pneumatic Drill	
70		Moderately Loud
60	10' From a Vacuum Cleaner	
	Department Store	
50	Private Business Office or 100' From Light Traffic	
	200' From a Large Transformer	
40		Quiet
30	Quiet Bedroom or 5' From a Soft Whisper	
20	Recording Studio	
10		Threshold of Hearing
0		

Note:

1. This table is meant to give the reader a sense of A-weighted sound levels by providing an example of a noise source or an environment corresponding to a certain noise level. For example, a person at a rock music concert would experience noise levels of 110 dBA; a person standing 200 feet from a jet takeoff would experience noise levels of 120 dBA.

Source: EIP Associates.

- **Equivalent energy noise level** (L_{eq}) is the average acoustic energy content of noise for a stated period of time. The L_{eq} of two different time-varying noise events are the same if they deliver the same acoustic energy to the ear during exposure, no matter what time of the day or night they occur.

- **Day-night average noise level** (L_{dn}) is a 24-hour average L_{eq} with a 10 dBA "penalty" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for the greater sensitivity of people to nighttime noises.

- **Community Noise Equivalent Level** (CNEL) is a 24-hour average very similar to the L_{dn} with an additional 5 dBA "penalty" added to noise during the evening hours of 7:00 p.m. to 10:00 p.m. to account for nighttime noise sensitivity.

REGULATORY CONTEXT

Local noise policies relevant to the current project have been described in Noise Setting, pp. [III.F.2-3]. State and federal policies and criteria are described for informational purposes below. It should be noted that the current project is not specifically subject to these state and federal policies.

The U.S. Environmental Protection Agency (EPA) has compiled scientific information on the effects of noise exposure and defined acceptable exposure levels to protect public health and welfare with a margin of safety. These protective exposure levels were expressed in terms of suggested limits on the 24-hour average L_{eq} (55 dBA for outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.) or the L_{dn} (55 dBA in residential areas and other outdoor places where quiet is a basis for use). It is important to note that "public health and welfare" is an indivisible term; there are no separate "health" effects or "welfare" effects. Thus “public health and welfare” includes personal comfort and well-being, the absence of mental anguish, disturbances and annoyance, as well as the absence of clinical symptoms such as hearing loss or demonstrable physiological injury.[1] The EPA-defined acceptable noise exposure levels are conservative; they were developed without consideration of technical or economic feasibility and represent levels below which there is no reason to suspect

that the general population will be at risk from any of the identified effects of noise. Because the suggested noise levels that will protect public health and welfare were developed by the EPA without regard for economic or technical feasibility, they should not be viewed as regulatory criteria or goals, but as "levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise."[2]

The Federal Transit Administration (FTA) has adopted noise impact criteria that vary according to the existing noise level and the predicted project noise level.[3] The FTA uses these criteria primarily for new rail transit projects and related facilities and for bus projects operating on local streets. The criteria are based on the threshold at which a percentage of people in the community regard themselves as "highly annoyed" by their noise environment.

Table X.D.2 provides a summary of the FTA noise impact thresholds. The FTA considers that a rail transit project could have an impact if, for example, the project would add 1 dBA L_{dn} to the existing, 24-hour outdoor noise environment at 70 dBA. In that same outdoor environment, if the rail project were to add 3 dBA to the 24-hour L_{dn}, the FTA would consider the noise impact to be "severe."

The amounts of noise increase established in the criteria summarized in the table are based on percentages of people who would consider themselves highly annoyed by the change in noise levels. If the number of people in a community who consider themselves highly annoyed by a noise source increases by less than 2 percent, then 'no' impact is assumed by FTA because a 2 percent increase is the minimum measurable change in community reaction. A "severe" impact was established by FTA when a noise source would cause a 6.5 percent increase in the number of people "highly annoyed."

In order to limit population exposure to physically damaging and psychologically disruptive noise, the California Department of Health Services' (DHS) Office of Noise Control has issued noise exposure guidelines that established three categories of noise exposure severity in the outdoor environment:

TABLE X.D.2
FEDERAL TRANSIT ADMINISTRATION NOISE IMPACT THRESHOLDS FOR TRANSIT PROJECTS

L_{dn} (rounded to nearest whole decibel)		
Existing Noise Exposure	**Noise Increase w/ No Change in Community "Annoyance"[1]**	**Noise Increase w/ 6.5% Increase in Community "Annoyance"[2]**
50	5	10
55	3	7
60	2	5
65	1	4
70	1	3
75	0	2

Notes:

1. Community annoyance means people who are "highly annoyed" with the level of neighborhood noise. This concept is described in detail on pp. 2-7 to 2-9 of the source document.

2. FTA considers noise increases at or greater than this level to be "severe impacts." See source document Chapter 3 and Appendix A, pp. A-2 and A-3.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, DOT-T- 95-16, April 1995.

- Normally Acceptable (for residential uses and hospitals, an L_{dn} of 60 dBA or less) – no undue burden on affected receptors, needing no special noise insulation;

- Conditionally Acceptable (for residential uses and hospitals, an L_{dn} between 60 dBA and 75 dBA) – requires some noise insulation as established by an acoustic study to reduce interior noise; and

- Unacceptable (for residential uses and hospitals, an L_{dn} greater than 75 dBA) – noise exposure is so severe that it is not generally feasible to provide adequate insulation for acceptable interior noise levels.

The DHS guidelines serve as a model for use by counties and cities in the state. Most have changed the original DHS range specifications to some extent to suit their local conditions.

NOTES - Noise

1. Protestive Noise Levels: Condensed Version of EPA Levels Document, EPA 550/9-79-100, 1978.

2. Protestive Noise Levels: Condensed Version of EPA Levels Document, EPA 550/9-79-100, 1978, p. 24.

3. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, April 1995, U.S. Department of Transportation publication DOT-T-95-16, prepared by Harris Miller, Miller & Hanson Inc.

E. AIR QUALITY

This appendix includes additional details on carbon monoxide and fine particulates impacts analysis methods.

ANALYSIS METHODOLOGY

Carbon Monoxide

Caltrans' CALINE4 program was used to model local carbon monoxide (CO) impacts. The CALINE4 model was implemented according to the guidelines contained in *Transportation Project-Level Carbon Monoxide Protocol ("CO Protocol").*[1] Emission factors were derived using CT-EMFAC2.0, Caltrans' PC implementation of the California Air Resources Board's EMFAC7F1.1 mobile source emissions model.

Vehicular travel speeds on major arterials were obtained from the travel time analysis conducted by the project transportation consultant. For other surface streets in the general traffic study area but not included in the arterial analysis, speeds were derived from relationships between traffic volume/lane/hour and travel speeds given in Tables B.13 and B.14 of the *CO Protocol.* For the Interstate 80 freeway mainline and ramps, travel speeds were derived from mainline and intersection levels of service, respectively, based upon a Highway Research Board's *Highway Capacity Manual.*

For existing and future cumulative traffic in the project site vicinity, the percentages of vehicles operating in hot stabilized or cold start modes were derived, based on times of day and roadway types, as recommended in Caltrans' Technical Advisory T950428.02. This distinction is important because a motor vehicle whose engine has not been running for an extended period will emit pollutants at a higher rate until its catalytic converter has warmed up (i.e., during its "cold start" phase). All project trips arriving for a weekday night game (6:30 - 7:30 p.m.) were

assumed to be in hot stabilized mode since the vast majority of these vehicles would have traveled long enough to have "warmed up" before they enter the site vicinity. All project trips departing from a weekday night game (10:30 - 11:30 p.m.) were assumed to be in cold start mode, since virtually all of these vehicles would have been idle during the two- to three-hour game period.

Meteorological inputs to the CALINE4 model include wind speed, wind direction, wind variability, temperature, atmospheric stability and vertical mixing height. Values for wind speeds and variability were assumed to change with the time of day based upon the relationship presented in Table B.11 of the *CO Protocol*. CALINE4 automatically selected the "worst-case wind angle." Temperatures were taken from National Oceanic and Atmospheric Association monitoring data for San Francisco's Mission Dolores weather station. Only temperature data from April through October were considered, because baseball games would be limited to these months. Atmospheric stability estimates were also obtained from the *CO Protocol*'s Table B.11. A default mixing height of 1,000 meters (about 3,200 feet) was applied.

Typically, a persistence factor (i.e., the ratio between local worst-case eight-hour and one-hour concentrations) of 0.8 is applied to the modeled hourly CO concentrations to obtain eight-hour average estimates because this is consistent with the *CO Protocol*'s recommendations for "urban sites with a recognized tendency for persistent stagnant meteorological conditions and/or persistent traffic congestion." However, ballpark traffic would extend over no more than two or three hours of any given eight-hour period. Therefore, eight-hour local CO levels for game scenarios were estimated by assuming that only a portion of the ballpark's traffic would occur over an eight-hour averaging period.

Fine Particulates (PM_{10})

The U.S. Environmental Protection Agency measurements of dust emissions during construction of a shopping center in Arizona indicate that about 1.2 tons of dust per month

are emitted per acre of construction, about 64 percent of which is PM_{10}, a potential health threat to a sensitive population living near the construction activity. Thus uncontrolled construction-related PM_{10} emissions could generate up to 51 pounds (lb.) per acre per day, exceeding the Bay Area Air Quality Management District's 80 lb/day significance threshold when the area to be worked is greater than 1.5 acres.

NOTES - Air Quality

1. California Department of Transportation, *Transportation Project-Level Carbon Monoxide Protocol*, August 1995.

F. CONTAMINATION AND ENVIRONMENTAL RISK

This appendix contains supporting documentation for the hazardous materials analysis in this EIR. Specifically, it contains additional information regarding the regulatory setting, human health risk evaluation methodology, potential subsurface contamination and site sampling locations.

REGULATORY SETTING

Hazardous materials handling activities are subject to numerous laws and regulations at all levels of government intended to protect health and safety. These laws apply to the project sponsor just as they do to all hazardous materials users and hazardous waste generators. The laws and regulations summarized in this section are those most important to working with hazardous materials. Table X.F.1 lists these regulatory requirements.

Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal-OSHA) and the federal Occupational Safety and Health Administration (OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations.

Under the authority of the Occupational Safety and Health Act of 1970, the federal government has adopted numerous regulations pertaining to worker safety (contained in the *Code of Federal Regulations,* Title 29). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling, including

TABLE X.F.1
SUMMARY OF ENVIRONMENTAL REGULATIONS AND COMPLIANCE REQUIREMENTS

Hazardous Materials Transportation

U.S. Department of Transportation regulations in *Code of Federal Regulations*, Title 49, Parts 171-179
U.S. Postal Service regulations in *Code of Federal Regulations*, Title 39
California Vehicle Code, Section 32000 *(et seq.)*
California Code of Regulations, Title 13, Sections 12-11776

Hazardous Material Worker Safety Requirements

Federal Occupational Safety and Health Act, 1970
California Health and Safety regulations in *California Code of Regulations*, Title 8
Toxic Substances Control Act implementation regulations, *Code of Federal Regulations*, Title 40
National Fire Codes, Title 45
California Fire Code, *California Code of Regulations*, Title 24
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

Hazardous Waste Handling Requirements

Federal Resource Conservation and Recovery Act, 1976
Federal Hazardous and Solid Waste Act, 1984
California Hazardous Waste Control Law, Health & Safety Code, Section 25100 *et seq*, California Code of Regulations, Title 22, Section 66260.1 *et seq.*

Source: EIP Associates, San Francisco.

workplace conditions, employee protection requirements, first aid, fire protection, and material handling and storage.

Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as federal standards. Cal-OSHA regulations concerning the use of hazardous materials in the workplace (*California Code of Regulations,* Title 8, Section 3203) include requirements for employee safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA enforces

regulations which contain training and information requirements, including procedures for identifying and labeling hazardous substances as well as communicating information related to hazardous substances and their handling. Cal-OSHA regulations also require that Material Safety Data Sheets (MSDS) and chemical safety information be available to employees and that employee information and training programs be documented. Detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in the *Code of Federal Regulations,* Title 29. Cal-OSHA regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and emergency evacuation training). Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must be kept in accessible places. Compliance with these regulations reduces the risk of accidents, worker health effects, and emissions.

The California Fire Code (*California Code of Regulations*, Title 24), which is enforced by the San Francisco Fire Department, contains state standards for the use and storage of hazardous materials, and special standards for buildings where hazardous materials are found. Some of these regulations consist of adopted and amended *National Fire Codes*, Standard 45, which are a nationally recognized standard. California Fire Code regulations require personnel training, written procedures and a facility closure plan for hazardous materials.

The California Safe Drinking Water and Toxics Enforcement Act (Proposition 65), implemented by the state Office of Environmental Health Hazard Assessment, includes the following three elements: 1) prohibits discharges of chemicals known to the State of California to cause cancer or to exhibit reproductive toxicity to any source of drinking water; 2) requires that anyone to be exposed to such chemicals be warned before such exposure occurs; and 3) requires that designated employees report any illegal discharge or threatened illegal discharge of a hazardous waste. State agencies are not required to comply with the first two requirements of Proposition 65, but must comply with the reporting requirements.

Hazardous Waste Handling Requirements

The federal Resource Conservation and Recovery Act (RCRA) of 1976 created the federal hazardous waste regulatory program administered by the U.S. Environmental Protection Agency (U.S. EPA). Under the Act, the U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."

RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle-to-grave" system of regulating hazardous wastes. The Hazardous and Solid Waste Act specifically prohibits the use of certain techniques for the disposal of some hazardous wastes.

Under RCRA, individual states may implement their own hazardous waste programs in lieu of federal requirements as long as the state program is at least as stringent as the federal requirements. The U.S. EPA approved California's program to implement federal regulations as of August 1, 1992.

The Hazardous Waste Control Law is administered by the California Department of Toxic Substances Control (DTSC). Under the law, the DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. State requirements differ little from federal laws; both RCRA and the Hazardous Waste Control Law impose "cradle to grave" regulatory systems for handling hazardous wastes in a manner that protects human health and the environment. Regulations implementing the state law are generally more stringent than regulations at the federal level.

State regulations list 791 hazardous chemicals as well as 20 to 30 more common materials that may be hazardous; establish criteria for identifying, packaging and labeling hazardous wastes; prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Under both state and federal law, hazardous waste generators are required to prepare hazardous waste manifests. Hazardous waste manifests list a description of the waste, its intended destination and regulatory information about the waste. Copies of the manifests must be carried by licensed hazardous waste transporters during waste transportation. A copy of each manifest must be filed with the state. The waste transporters must obtain certification at waste-handling facilities, including transfer facilities and treatment, storage or disposal facilities, regarding the waste received and provide a copy of the certification to the generator. The generator must match copies of hazardous waste manifests with certification notices from the waste-handling facilities. The hazardous waste manifests must be retained by the generator for a minimum of three years.

Hazardous Materials Transportation

The U.S. Department of Transportation has the regulatory responsibility for the safe transportation of hazardous materials between states and to foreign countries. Regulations issued by the Department govern all methods of transportation, except for those packages shipped by mail, which are covered by the U.S. Postal Service regulations. Department of Transportation regulations are contained in the *Code of Federal Regulations*, Title 49; Postal Service regulations are found in Title 39.

Every package type used by a hazardous materials shipper must undergo tests which imitate some of the possible rigors of travel. While not every package must be put through every test, most packages must be able to undergo the following generic test without leaking: the ability to be 1) kept under running water for one-half hour; 2) dropped, fully loaded, onto a concrete floor; 3) compressed from both sides for a period of time; 4) subjected to low and high pressure; and 5) frozen and heated alternately.

Under RCRA, the U.S. EPA set standards for transporters of hazardous waste. In addition, the State of California regulates the transportation of hazardous waste originating or passing

through the state; state regulations are contained in the *California Code of Regulations*, Title 13. Two state agencies have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies: the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans).

The California Highway Patrol, pursuant to the California Vehicle Code, Section 32000, is required to license every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards. Common carriers conduct a large portion of their business in the delivery of hazardous materials.

Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests.

The CHP enforces hazardous materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to clean-up crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance.

Caltrans has emergency chemical spill identification teams at 72 locations throughout the state. The Caltrans spill identification teams nearest to the project site are located in Richmond. These teams can respond within approximately 30 minutes. Within approximately two hours of notice, contracted spill remediation firms are available to assist Caltrans crews deal with larger emergency situations.

Hazardous Waste in Soil

Article 20, Section 1000 et. seq., of the San Francisco Public Works Code, entitled "Analyzing the Soil for Hazardous Waste," also known as the Maher Ordinance, requires building permit applicants that propose to disturb in excess of 50 cubic yards of soil east of the 1851 high tide line to conduct environmental site assessments. Because the entire project area is composed of artificial fill, site assessment prior to construction is intended to identify potential hazardous materials that would be encountered during excavation. The Maher Ordinance, at Section 1001(c), authorizes the Director of Public Works to require soil analysis pursuant to the ordinance when the Director has reason to believe that hazardous waste may be present in the soil at the construction site.

The entire area east of the 1851 high tide line is composed of artificial fill and is known to include construction and demolition debris, along with hazardous materials such as oil and grease, gasoline and diesel fuel, and other toxic compounds. Based on what has been found in this area in the past, Article 20, Section 1002(b) recommends the following soil tests to be performed: persistent and bioaccumulative inorganic toxic substances listed in Section 66261.24 of Title 22 of the *California Code of Regulations*, such as mercury and lead; volatile organic toxic pollutants such as carbon tetrachloride and vinyl chloride; PCBs (polychlorinated biphenyls); pH (degree of acidity or alkalinity); flammability; cyanides; sulfides; methane and other flammable gases; hazardous wastes designated by the Director (Department of Public Works, City and County of San Francisco); any other hazardous waste that either the Director of Public Health or the certified laboratory has reason to conclude may be present on a site. The latter decision is generally based on the history of past activities on the site which is required by the Maher Ordinance prior to development and approval of the site sampling plan.

Geomatrix was retained by the project sponsor to conduct a site assessment that would meet the requirements of the Maher Ordinance for the ballpark site. A Work Plan to conduct the site assessment was prepared which included the results of past site investigations and the site

history.[1] The Work Plan and its attachments[2] satisfy the requirements for the Site History as set forth in the Maher Ordinance.[3] The site investigation results as outlined in the *Site Investigation Report and Risk Evaluation*, dated October 1996, and its attachment[4] satisfy the requirements for the Soil Analysis Report as set forth in the Maher Ordinance.[5]

The Maher Ordinance, in part, requires that the project sponsor submit a site mitigation report, prepared by a qualified person, to the Director of Public Works and the Director of Public Health. That report must include a statement signed by the person who prepared the report certifying that the person is a qualified person within the meaning of the ordinance, and that in his or her judgment either no mitigation is required or the mitigation measures identified, if completed, will mitigate the significant environmental or health and safety risks caused by or likely to be caused by the hazardous wastes in the soil (see Maher Ordinance, Section 1004).

The Maher Ordinance also provides that, upon completion of the site mitigation, the applicant shall certify that:

- No hazardous wastes in the soil are causing, or are likely to cause, significant environmental or health and safety risks, and therefore no mitigation is recommended;
- All mitigation measures recommended in the site mitigation report have been performed, and that mitigation has been verified by follow-up soils analysis if recommended in the site mitigation report; or
- If applicable, the applicant has received certification or verification from the appropriate federal or state agencies that mitigation is complete (see Maher Ordinance, Section 1005).

The certification must also contain specific language stating that the applicant recognizes that it cannot delegate the duty to perform site mitigation and that the applicant is responsible, and ultimately liable, for failure to perform site mitigation.

Structural Components

Asbestos

Federal and state laws and regulations pertain to building materials containing asbestos. Inhalation of airborne fibers is the primary mode of asbestos entry into the body, making friable (easily crumbled) materials the greatest health threat. For this reason, it is regulated both as a hazardous air pollutant under the Clean Air Act and as a potential worker safety hazard under the authority of Cal-OSHA. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos. The agencies with primary responsibility for asbestos safety are the Bay Area Air Quality Management District, Cal-OSHA and OSHA, and U.S. EPA. Some state regulations addressing asbestos-containing materials are more stringent than federal regulations. For example, California requires licensing of contractors who conduct abatement activities.

Polychlorinated Biphenyls (PCBs)

The *Code of Federal Regulations*, Title 40, contains the Toxic Substances Control Act regulations. This Act restricts the use and storage of PCB-containing transformers (defined as those containing at least 500 parts per million PCBs). The U.S. EPA also requires that all PCB-containing transformers, whether in use or in storage, be registered with fire protection personnel, and that they be inspected by said personnel every three months. If a leak is found, it must be contained to prevent release and exposure, and then be eliminated.

HUMAN HEALTH RISK EVALUATION METHODOLOGY

The health risk evaluation is performed in accordance with guidance documents provided by the Cal-EPA, U.S. EPA and other state and federal regulatory agencies, as appropriate. The risk assessment process included data evaluation, exposure assessment, toxicity assessment and risk characterization.

Data evaluation is the process of analyzing site characteristics and analytical data to identify chemicals that may be present at concentrations of toxicological concern. Exposure assessment is the process of measuring or estimating the intensity, frequency, and duration of human exposure. The principal elements of exposure assessment include:

- Evaluation of the influence of fate and transport processes for the chemicals of potential concern;
- Identification of potential exposure pathways;
- Identification of potential exposure scenarios;
- Calculation of representative chemical concentrations; and
- Estimation of potential chemical uptake.

The purpose of the toxicity assessment is to evaluate available information regarding the potential for a chemical to cause adverse health effects in exposed individuals and to estimate the relationship between the extent of exposure and the increased likelihood and/or severity of adverse effects. Risk characterization represents the results of the exposure and toxicity assessments integrated into quantitative or qualitative estimates of potential health risks. Noncarcinogenic and carcinogenic health risks are characterized separately.

Noncarcinogenic Health Risks

Potential noncarcinogenic adverse health effects are evaluated by comparing the average daily dose (ADD) to the appropriate reference dose (RfD). The ADD provides quantitative

estimates of an individual's daily exposure to a chemical. RfDs established by Cal-EPA, U.S. EPA and other regulatory agencies represent toxicity criteria used to evaluate noncarcinogenic health risks. The comparison of ADD to RfD is expressed in terms of a "hazard quotient" and is calculated as follows:

$$\text{Hazard Quotient} = \text{ADD/Rfd}$$

A hazard quotient less than or equal to one indicates that the predicted exposure should not pose a significant noncarcinogenic health risk according to U.S. EPA guidelines.[6] In cases where individual chemicals potentially act on the same human body organs or result in the same health endpoint, additive effects are addressed by calculating a hazard index as follows:

$$\text{Hazard Index} = \text{SUM}(\text{Hazard Quotient}_1 + \text{Hazard Quotient}_2 + \ldots + \text{Hazard Quotient}_n)$$

A hazard index of less than or equal to one is indicative of acceptable levels established by the U.S. EPA of exposure for chemicals having an additive effect. For the human health risk evaluation for the ballpark project, a screening-level hazard index was calculated by summing the hazard quotient for all chemicals, regardless of toxic endpoint (any particular body organ).[7] This approach overestimates the potential for noncarcinogenic health effects due to simultaneous exposure to multiple chemicals.

Carcinogenic Health Risks

Carcinogenic health risks are defined in terms of the probability of an individual developing cancer as the result of exposure to a given chemical at a given concentration. In order to evaluate carcinogenic health risks, the dose of each chemical of potential concern via each appropriate exposure pathway is converted to risk which is added to achieve a total risk for each chemical. Then, risks presented by each chemical are added to arrive at the total

cumulative risk. Lifetime cancer risks for receptors at the ballpark site are estimated as follows:

Estimated Cancer Risk = LADD x SF

where:

LADD = Lifetime average daily dose

SF = Carcinogenic potency slope factor

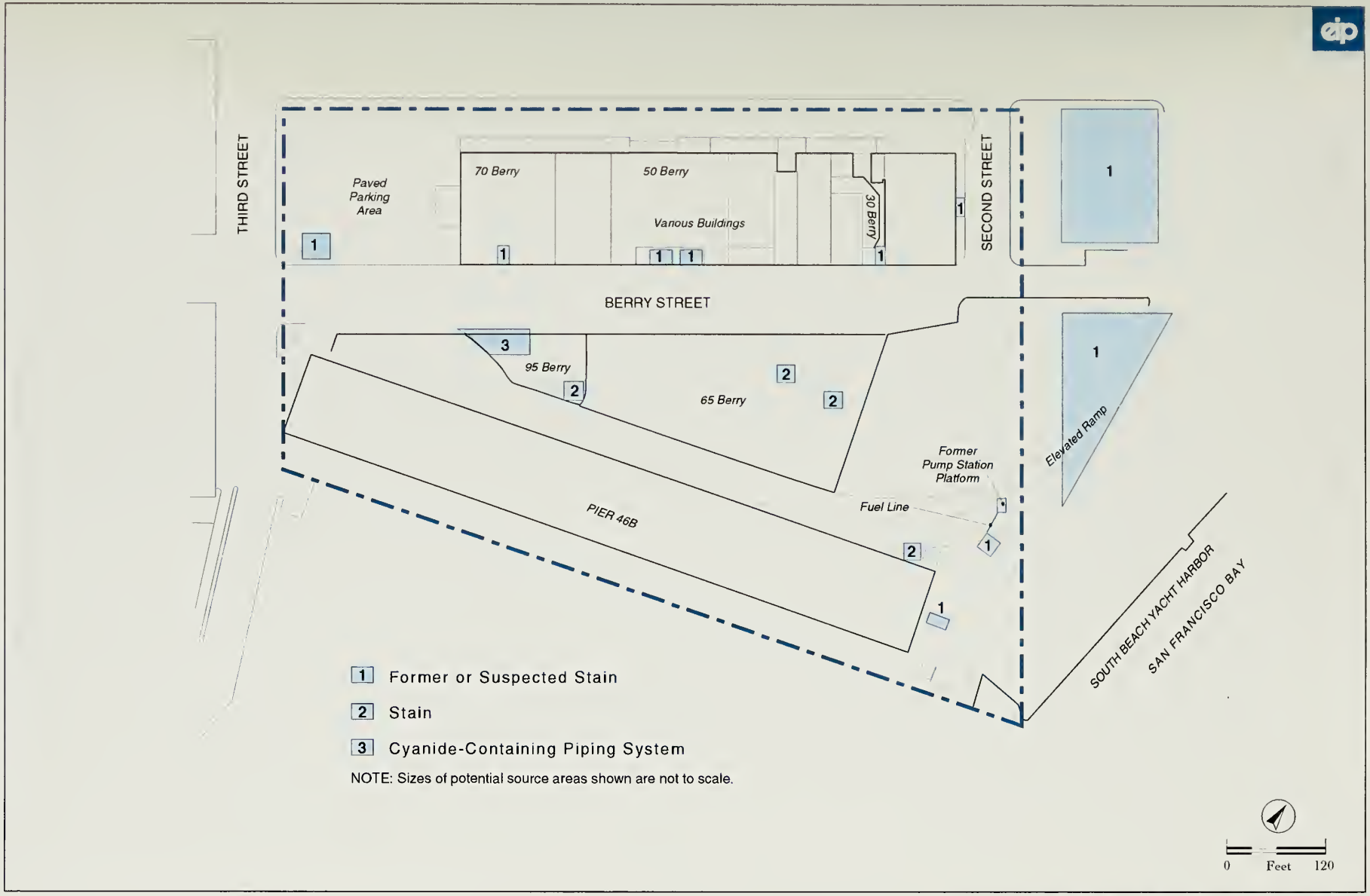
Slope factors are the functions that convert the retained dose of a chemical into the probability that an individual will contract cancer over his or her lifetime due to the dose received of that chemical. The probability of contracting cancer is called the individual cancer risk. The dose-response formulas used to calculate this risk are termed the 95 percent upper confidence limits and reflect a 70-year human life expectancy. This means that the slope factor calculated is not a most-likely estimate but a reasonable maximum estimate and is probably an overestimation of the risks presented. The real risks, therefore, are probably significantly lower than what was calculated. By using a 95 percent upper confidence limit and a 70-year exposure, the estimate of carcinogenic response is conservative, overestimating the actual risk posed by the chemical.[8]

According to U.S. EPA guidelines, estimates of lifetime cancer risk associated with exposure to chemicals of less than 1 in 1 million are considered below a level of significant concern.[9] This means that if one million people were to be exposed to chemicals at the same concentration for every minute of every day for an entire 70-year lifespan, a maximum of one excess cancer is predicted to occur within that population as a result of that exposure. Because the background cancer incidence rate in the U.S. is approximately 25 percent[10], a cancer risk of 1 in 1 million would indicate that instead of expecting 250,000 persons to contract cancer out of a population of one million, 250,001 (one in excess of background) would be expected.

Risks within the range of 1 in 1 million to 100 in 1 million may be acceptable depending on site-specific considerations or other factors.[11] The range of acceptable risk is intended to allow a risk manager to exercise judgement in the evaluation of the significance of the results of a health risk assessment. For example, a risk near the upper-end of the range may be acceptable if the exposed population is small or the exposure scenarios are suitably conservative, e.g., consistently overpredict actual risk. Contrarily, the acceptable risk may be at the low end of the range if the health risk assessment assumptions are not conservative, e.g., predict actual exposures, or the exposed population is large. The use of the range as a public health policy tool is appropriate because estimates of cancer risk are not estimates of real, anticipated risk, but rather represent the hypothetical worst-case potential impact. The actual risk could actually be zero. The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) considers lifetime excess cancer risks less than 10 in 1 million as being insignificant for purposes of the Act; no warning to the potentially exposed population is required under these circumstances or for risk levels at 10 in 1 million or less.

POTENTIAL SUBSURFACE CONTAMINATION

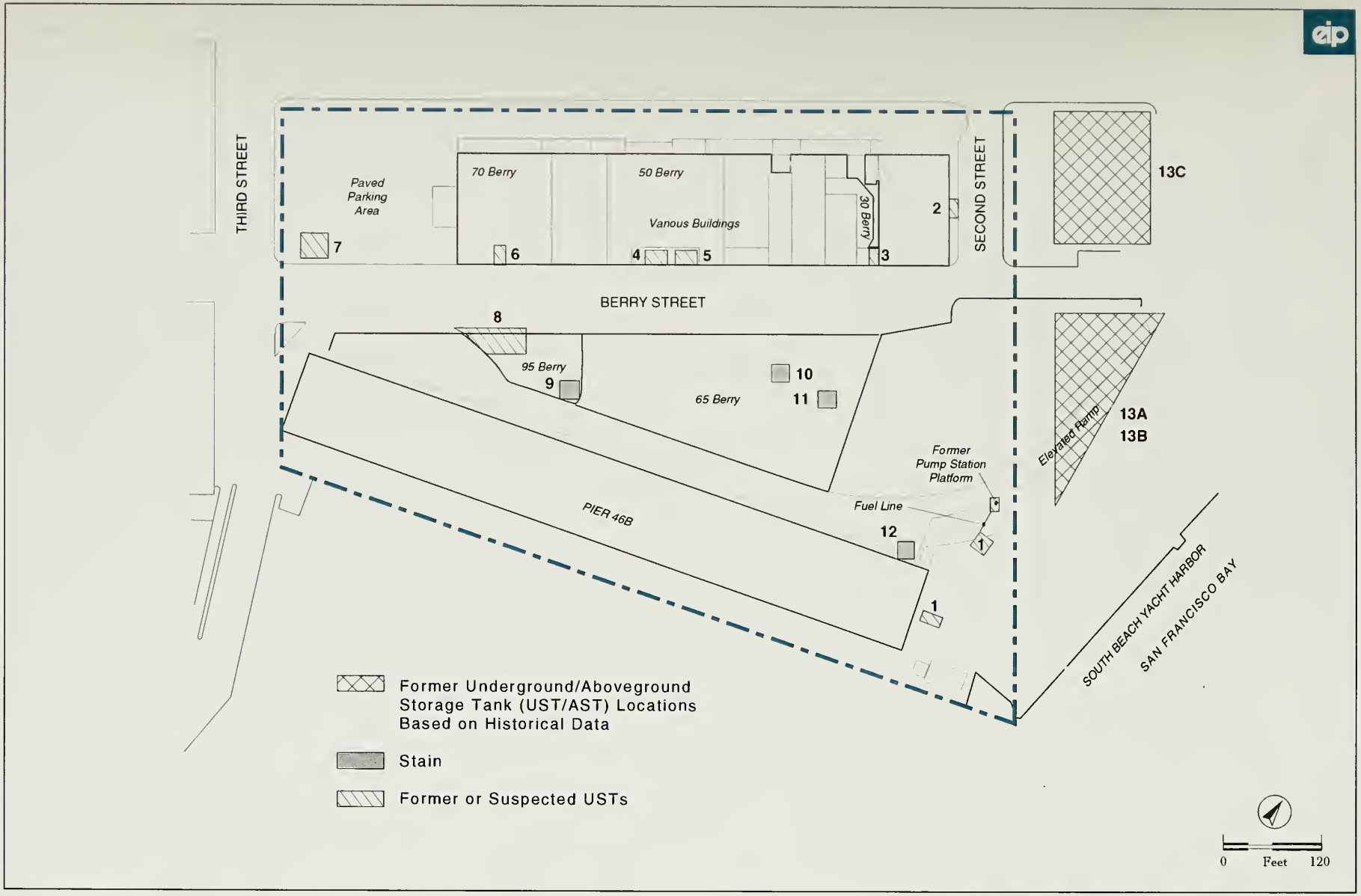
Based on information obtained during past investigations and site reconnaissance, Geomatrix initially identified areas of the project site with potential subsurface contamination, as shown in Figure X.F.1. There are various locations at the project site where underground storage tanks (USTs) and aboveground storage tanks (ASTs) were used in the past. Some of those USTs and ASTs have been removed but in some cases the status is unknown, as shown in Figure X.F.2.



SOURCE: Geomatrix Consultants, Incorporated, San Francisco, CA

GIANTS BALLPARK

Figure X.F.1 Potential Subsurface Contamination Locations



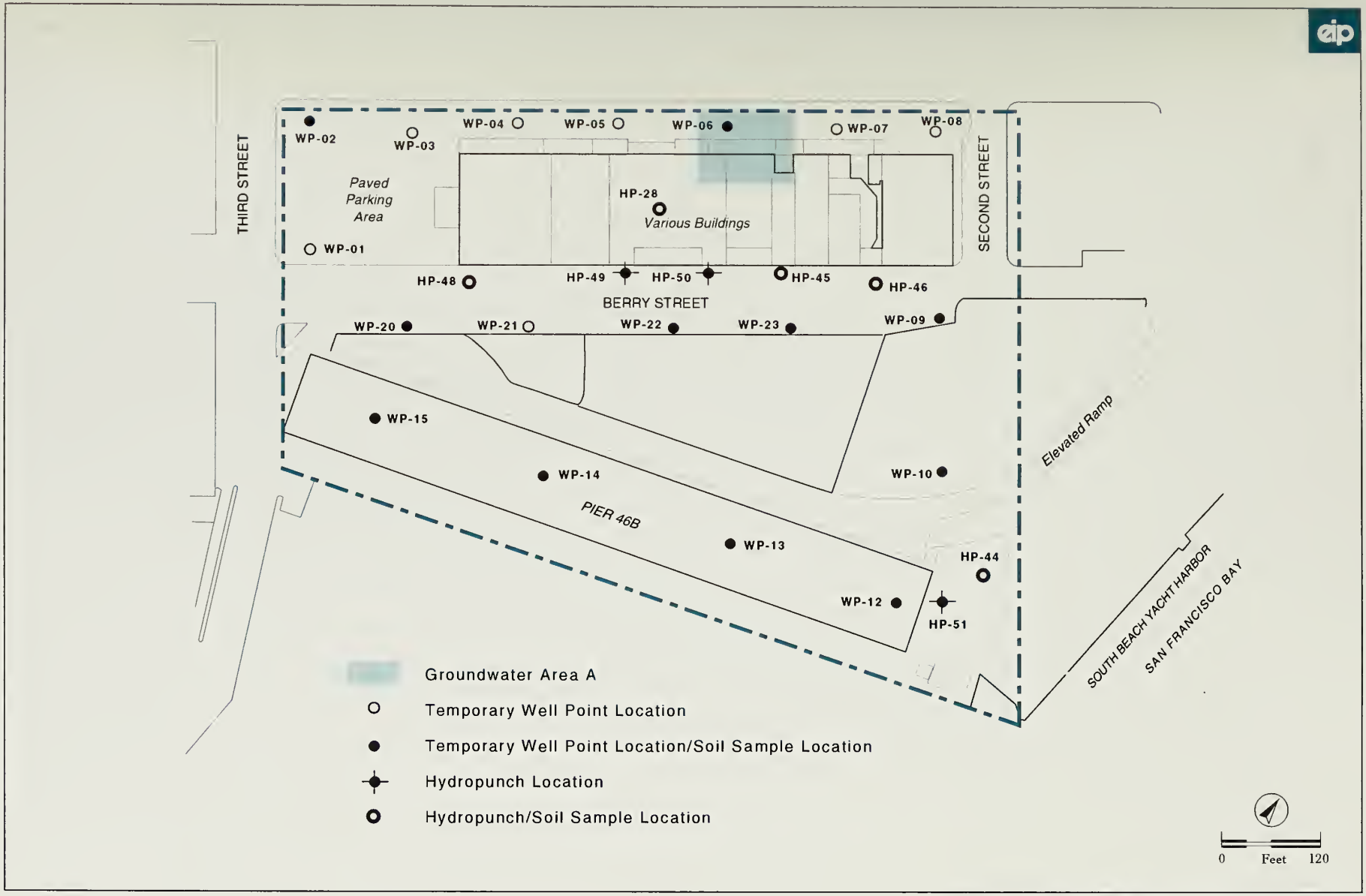
SOURCE: Geomatrix Consultants, Incorporated, San Francisco, CA

GIANTS BALLPARK

Figure X.F.2 Former or Suspected Underground Storage Tanks and Potential Source Areas

SITE SAMPLING LOCATIONS

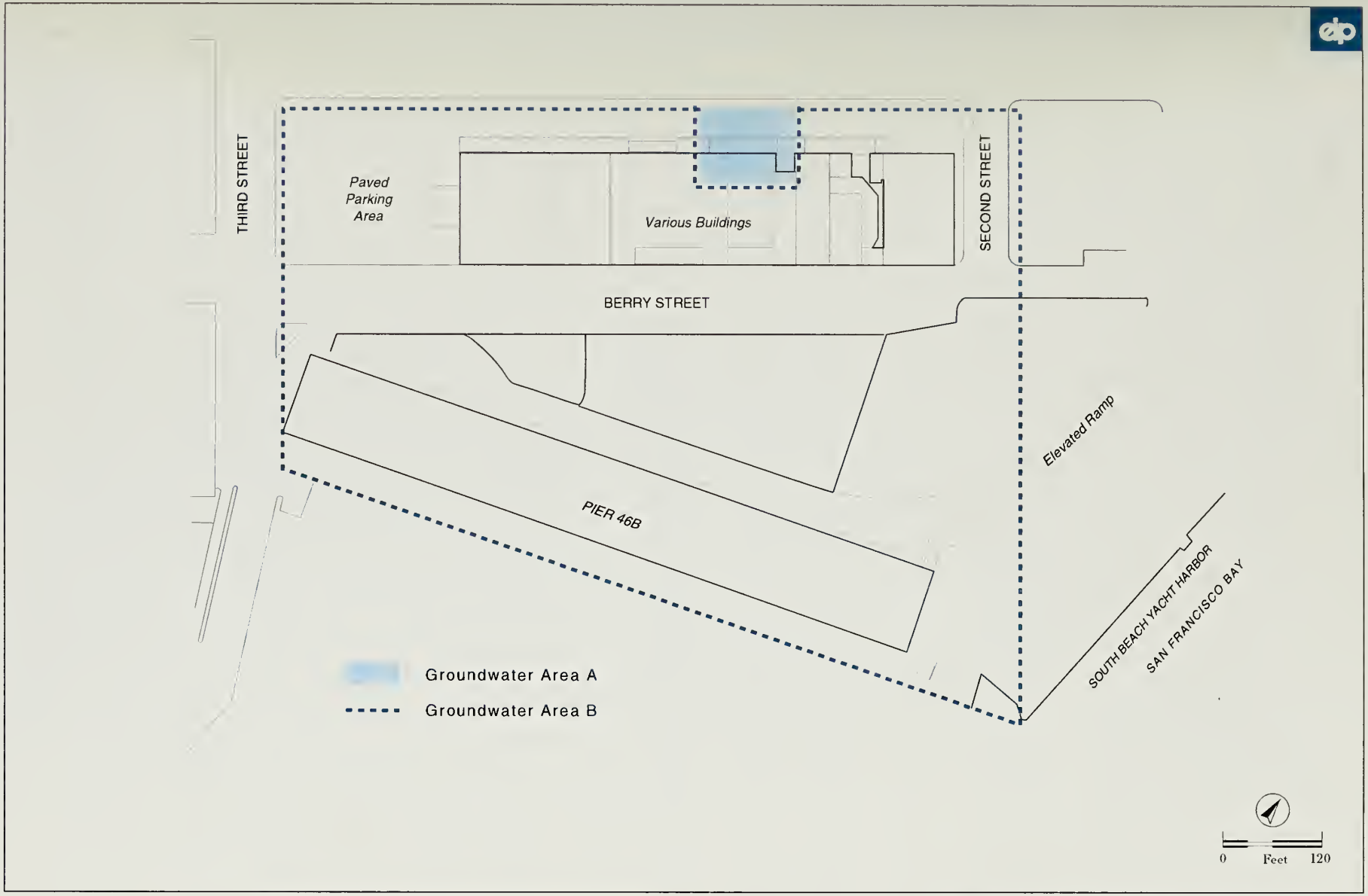
A soil and groundwater investigation and risk evaluation for the ballpark site was conducted by Geomatrix Consultants, Inc. due to previous industrial uses on the site. The sampling locations for the site investigation are shown in Figure X.F.3. Evaluation of the health risk posed by inhalation of vapors emanating from contaminated soil or groundwater considered the site as two separate areas, as shown in Figure X.F.4. Area A pertains to groundwater represented by well point WP-06, a small area on the south side of King Street about one-third of the distance between Second Street and Third Street, and Area B pertains to groundwater represented by all well points and Hydropunch™[12] samples except for well point WP-06. Well point and Hydropunch™ sample locations are shown in Figure X.F.3.



SOURCE: Geomatrix Consultants, Incorporated, San Francisco, CA

GIANTS BALLPARK

Figure X.F.3 Sampling Locations for Project Site Investigation



SOURCE: Geomatrix Consultants, Incorporated, San Francisco, CA

GIANTS BALLPARK

Figure X.F.4 Project Site Area A and Area B Locations

NOTES - Contamination and Environmental Risk

1. Geomatrix Consultants, Inc. *Work Plan for Investigation of the Giants Pacific Bell Park Site, San Francisco, California*, May 1996.*

2. Geomatrix Consultants, Inc. Addenda to *Work Plan for Investigation of the Giants Pacific Bell Park Site, San Francisco, California*, May 1996 (Addendum 1, May 1996 and Addendum 2, July 1996).*

   Memoranda prepared by Geomatrix Consultants, Inc.: "Response to Comments on Addendum 2 and Approach for Assessing Extent of Chemical Containing Water near a Subsurface Utility Beneath Berry Street," August 22, 1996 and Additions to Addendum 2 of the Work Plan, September 20, 1996.*

3. Letter from Ben Gale, Director, City and County of San Francisco, Department of Public Health, to John Yee, San Francisco Giants, dated December 3, 1996.

4. Letter from Amanda L. Spencer, Senior Geologist, Geomatrix Consultants, Inc. to Vic Pal, San Francisco Bay Regional Water Quality Control Board, dated November 22, 1996.

5. Letter from Ben Gale, Director, City and County of San Francisco, Department of Public Health, to John Yee, San Francisco Giants, dated December 3, 1996.

6. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Risk Assessment Guidance for Superfund*, Volume I, Human Health Risk Evaluation Manual, Part A, Interim Final, Washington, D.C., 1989.

7. Geomatrix Consultants, Inc., *Site Investigation Report and Risk Evaluation*, Giants Pacific Bell Park Site, San Francisco, California, Volume 1, October 1996.*

8. Geomatrix Consultants, Inc., *Site Investigation Report and Risk Evaluation*, Giants Pacific Bell Park Site, San Francisco, California, Volume 1, October 1996.*

9. U.S. Environmental Protection Agency, *National Oil and Hazardous Substances Pollution Contingency Plan, 55 Federal Register 8666*, March 1990.

10. Baseline Environmental Consulting, *Health Risk Assessment, South Beach Park Project*, San Francisco, California, April 1993.

11. U.S. Environmental Protection Agency, *National Oil and Hazardous Substances Pollution Contingency Plan, 55 Federal Register 8666*, March 1990.

12. The hydropunch method uses a specially designed tool that collects grab groundwater samples from soil boring holes.

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

G. WATER QUALITY AND AQUATIC ECOLOGY

WATER QUALITY MANAGEMENT POLICIES FOR THE PROJECT AREA

In the project area, water resources policies are administered by several agencies, including the City and County of San Francisco Water Department (SFWD), the San Francisco Bay Regional Water Quality Control Board, (RWQCB); the State Water Resources Control Board (State Water Board), and the U.S. Environmental Protection Agency (U.S. EPA). Development of the project may be subject to the federal Clean Water Act, which is enforced by the U.S. EPA and California Environmental Protection Agency (Cal-EPA); the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act) and related California Code of Regulations sections administered by the State Water Board and the RWQCB; and permitting and licensing requirements that occur during development review by the City and County of San Francisco.

San Francisco Bay Basin Water Quality Control Plan

The RWQCB regulates surface water and groundwater quality in San Francisco Bay through its San *Francisco Bay Basin Water Quality Control Plan* (Basin Plan), which fulfills the requirements of the Porter-Cologne Act that call for water quality control plans in California.[1] The Basin Plan is the master policy document describing the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay region. The plan identifies the beneficial water uses of San Francisco Bay, the water quality objectives needed to protect the beneficial water uses, and the strategies and time schedules for achieving those objectives. Water quality objectives are established for receiving waters in the form of narrative objectives, which present general descriptions of water quality goals, and numerical objectives, which describe pollutant concentrations, physical/chemical conditions of the water itself, and the toxicity of the water to aquatic organisms. To meet objectives for the receiving water, water quality standards are established for water that is

discharged. Water quality standards include discharge prohibitions and numerical effluent limitations.

State policy for water quality control is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Maximum benefit requires that water quality be consistent with beneficial uses identified for each water body. The Basin Plan identifies beneficial uses for the San Francisco Bay that include: ocean commercial and sports fishing; estuarine habitat; industrial service supply; fish migration; navigation; industrial process supply; preservation of rare and endangered species; water contact recreation; non-contact water recreation; shellfish harvesting; fish spawning; and wildlife habitat.

The RWQCB identifies beneficial uses for individual groundwater basins in the San Francisco Bay Area. The Giants ballpark site is located within the San Francisco Sand Dune groundwater basin, which underlies almost all of the City. The Basin Plan identifies municipal and agricultural water supply as existing beneficial uses for this groundwater basin, and industrial process water supply and industrial service water supply as potential beneficial uses.

Water quality objectives are established for receiving waters in the form of narrative objectives, which present general descriptions of water quality goals, and numerical objectives, which describe pollutant concentrations, physical/chemical conditions of the water itself, and the toxicity of the water to aquatic organisms. To meet objectives for the receiving water, water quality standards are established for water that is discharged. Water quality standards include discharge prohibitions and numerical effluent limitations.

NPDES PERMITS

Water quality objectives for San Francisco Bay are achieved primarily through the establishment and enforcement of Waste Discharge Requirements for point and non-point

wastewater dischargers. Prior to authorizations for waste discharge by the RWQCB the Porter-Cologne Act requires reports of waste dischargers to be filed. The RWQCB then prescribes Waste Discharge Requirements under a provision of the Porter-Cologne Act. As the wastewater dischargers for San Francisco, the wastewater treatment plants in the City operate under individual National Pollutant Discharge Elimination System (NPDES) permits. Thus, all wastewater discharges from the City and County of San Francisco are subject to Basin Plan and NPDES permit requirements.

As an implementation action to achieve the water quality objectives, effluent limitations are also set in the Basin Plan to regulate discharge. Effluent limitations are typically incorporated into individual NPDES permits which are specific to each wastewater treatment plant. NPDES permits are issued by the RWQCB and are subject to review by the U.S. EPA. NPDES permits must meet limitations established in the Basin Plan and if necessary, must specify stricter standards depending on the site-specific conditions of the receiving water. The City's treatment plants which discharge into the Bay are the Southeast Water Pollution Control Plant, during both dry and wet weather, and the North Point Water Pollution Control Plant, during wet weather only.

WET WEATHER OVERFLOWS

The NPDES permit for the Southeast Plant allows a long-term average of one overflow per year for each outfall south of Islais Creek, ten overflows per year for each outfall between Islais Creek and the Bay Bridge, and four overflows per year for each outfall between the Bay Bridge and the Golden Gate Bridge.[2] The volume of overflows discharged during the 1995 to 1996 rainy season from all overflow points on the San Francisco Bay and Pacific Ocean shoreline totaled 1,176 million gallons. Data on volumes released from individual overflow points are not maintained by the City because flow rates are not measured there. Several overflow structures discharge into China Basin Channel. The one closest to the ballpark site is off Berry Street at the Lefty O'Doul Bridge. According to City staff, the

majority of overflows into China Basin Channel during the most recent year of record (1995-1996) were released from the Sixth Street/Berry Street outfall at the western end of China Basin Channel.[3] Combined sewer overflows into China Basin Channel occurred three times during the most recent year of record (1995-96 water year): December 12, 1995, January 18, 1996, and February 21, 1996.[4]

NOTES - Water Quality and Aquatic Ecology

1. San Francisco Bay Regional Water Quality Control Board, *San Francisco Bay Basin (Region 2), Water Quality Control Plan*, June 21, 1995.

2. San Francisco Bay Regional Water Quality Control Board, City and County of San Francisco, Southeast Water Pollution Control Plant, NPDES Permit No. CA0037664, adopted October 19, 1994.

3. James Salerno, Laboratory Supervisor, Southeast Water Pollution Control Plant, Bureau of Water Pollution Control, Department of Public Works, City and County of San Francisco, personal communication, August 16, 1996.

4. City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Overflow Monitoring Program Summary, Data for overflow structure OV-6; 6th Street/Berry Street.

XI. EIR AUTHORS AND CONSULTANTS; ORGANIZATIONS AND PERSONS CONSULTED

EIR AUTHORS

San Francisco Department of City Planning
1660 Mission Street
San Francisco, CA 94103

- Hillary Gitelman, Environmental Review Officer
- Jim McCormick, EIR Coordinator
- Paul Deutsch, Senior Planner
- William Wycko, Associate Transportation Planner

San Francisco Redevelopment Agency
770 Golden Gate Avenue
San Francisco, CA 94102

- Thomas G. Conrad, Chief, Planning and Programming
- Stanley Muraoka, Associate Planner

EIR CONSULTANTS

EIP Associates
601 Montgomery Street, Suite 500
San Francisco, CA 94111

- Nancy Cunningham Clark, Project Director
- Lezley Buford, AICP, Project Manager (Plans and Policies, Visual Quality and Lighting)
- Ted Adams and Michael Rice, AICP (Visual Quality and Lighting)
- Kimberly M. Avila (Land Use, Growth Inducement, Alternatives)
- George Burwasser (Seismicity)
- Sangeeta Goyal (Contamination and Environmental Risk)
- Geoff Hornek (Noise, Air Quality)
- Rita Lee (Water Quality and Aquatic Ecology)
- Michael Rice, AICP (Shadows and Wind)
- S. Elizabeth Haines, Editor
- Andrew Lynch, Lead Word Processor
- Valerie Reichert, Graphic Artist

Environmental Science Associates
(Wind/Shadows)
301 Brannan, Suite 200
San Francisco, CA 94107-1849
Charles B. Bennett, Vice President

Joseph O'Connor
(Aquatic Ecology)
164 Bedford
Hercules, CA 94547
Joseph O'Connor, Ph.D.

Pittman & Hames Associates
(Parking)
400 Montgomery Street, Suite 1110
San Francisco, CA 94104
Donna Pittman, Principal

Square One Productions
(Photomontages)
725 Filbert Street
San Francisco, CA 94107
Hartmut H. Gerdes, AICP

Wilbur Smith Associates
(Transportation and Circulation)
221 Main Street, Suite 1200
San Francisco, CA 94105-1915
William Hurrell, Vice President
Jason Loo, Transportation Planner
Ronald Foster, Senior Transportation Planner

Wilson, Ihrig & Associates, Inc.
(Noise)
5776 Broadway
Oakland, CA 94618
James T. Nelson, Ph.D., Vice President

Bruce R. White
(Wind)
Professor of Mechanical Engineering
University of California, Davis
Bruce R. White, Ph.D.

PROJECT SPONSOR AND PROJECT CONSULTANTS

Project Sponsor

China Basin Ballpark Company, LLC
3Com Park at Candlestick Point
San Francisco, CA 94124
Jack Bair, Vice President and General Counsel, San Francisco Giants
Alfonso Felder, Legal and Public Affairs Coordinator, San Francisco Giants
Jorge Costa, Vice President of Stadium Operations and Security

Project Attorney

Coblentz, Cahen, McCabe & Breyer, LLP
222 Kearny Street
San Francisco, CA 94108
Harry O'Brien, Esq.
Tay C. Via, Esq.

Project Sponsor's Consultant

Keyser Marston Associates
55 Pacific Avenue Mall
San Francisco, CA 94111
Dean Macris, AICP

Project Architect

Hellmuth, Obata & Kassabaum, Inc.
Architecture, Engineering, Interiors, Planning, Graphics, Consulting
323 West 8th Street, Suite 700
Kansas City, Missouri 64105
Joseph E. Spear, AIA, Senior Vice President, Sports Facilities Group
Edward L. Eeds, AIA, Vice President, Sports Facilities Group

Project Engineers

Geomatrix
100 Pine Street
San Francisco, CA 94111
Amanda Spencer, Senior Hydrogeologist
Thomas E. Graf, Principal Engineer
Gregory Brorby, DABT, Senior Toxicologist

Treadwell & Rollo
555 Montgomery Street, Suite 1300
San Francisco, CA 94111
Frank Rollo, P.E., Principal Engineer
Lori Simpson, Project Engineer
Craig Shields, Engineer

Thornton-Tomasetti Engineers
641 6th Avenue, 7th Floor
New York, NY 10011
Leonard Joseph, Vice President

Project Contractors

Kajima International
610 W. De Leon
Tampa, FL 33606
Dennis Biggs, Construction Management Consultant
Masashi Katayama, Assistant Project Manager

MBC
113 W. Moore
Terrell, TX 75160
Max Chapman, President

ORGANIZATIONS AND PERSONS CONSULTED

City and County of San Francisco

Planning Department
Carol Roos, Planner
Catherine Bauman, Planner
Alice Glasner, Planner

San Francisco Redevelopment Agency
Walter Yanagita, Project Architect for South Beach Park
Michael Kaplan, Senior Project Manager

Port of San Francisco
Paul Osmundson, Director of Planning
Gary Olson, Superintendent of Maintenance
Carol Bach, Environmental Regulatory Specialist
Alec Bash, Planner
Kari Kilstrom, Planner
Charles Mitchell, Chief Wharfinger

Denise Turner, Wharfinger
Gerry Roybal, Marketing Representative, Press Relations & Community Affairs

San Francisco Municipal Railway (MUNI)
Bob Fossa, MUNI Scheduling Statistician
Peter Straus, Director of Service Planning
Elaine Cartwright, Project Manager, MUNI Capital Projects Department

San Francisco Transportation Authority
José Luis Moscovich, Director of Congestion Management

Department of Public Works
Tony Flores, Bayside Operations Superintendent
Charles Ng, Inspector, Department of Building Inspection
James Salerno, Laboratory Supervisor, Southeast Water Pollution Control Plant, Bureau of Water Pollution Control

San Francisco Fire Department
Frank Scales, Assistant Deputy Chief, Division of Support Services

State

California Department of Fish and Game
Diane Watters, Project Leader for Pacific Herring Research Project
Robert Tasto, Environmental Specialist Supervisor

California Integrated Waste Management Board
Sherrie Sala-Moore, Waste Management Specialist

State Lands Commission
David E. Plummer, Public Land Manager

Department of Transportation
Harry Yahata, Interim District Director

Regional

Bay Area Rapid Transit (BART)
Dean Leonard, Operations Support and Review Group

Peninsula Corridor Joint Powers Board
Gerald T. Haugh, Executive Director
Andrew Nash, Project Manager

California Regional Water Quality Control Board, San Francisco Bay Region
Vic Pal, Water Resource Control Engineer
Karen Taberski, Environmental Specialist
Ravi Avulanantham, Toxicologist

San Francisco Bay Conservation and Development Commission
Steve McAdam

Golden Gate Bridge Highway and Transit District
Maurice Palumbo, Transit Planner

SamTrans
Larry Stueck, Planning Manager

AC Transit
Steve Perry, Manager of Service Development

Metropolitan Transportation Commission
Chuck T. Purvis, Planner/Analyst

Persons and Organizations

Mehri Ansari, Associate, Rutherford & Chekene

Robert T. Battalio, P.E., Project Manager, Moffatt & Nichol Engineers

Barbara Chadwick, Planning Program Manager, Office of Planning and Development, City of Denver

Janet Gallegos, Project Coordinator, Booz, Allen & Hamilton Inc.

Linda Hendrickson, Chief City Planner, Department of Planning, City of Cleveland

Angie Perrilliat, Personnel Manager, Volume Services (concessionaire for San Francisco Giants)

Ben Ron, President, Martin Ron Associates

Dr. E.B. Thornton, Department of Oceanography, Naval Post-Graduate School

Kevin H. Wohlmut, P.E., Moffatt & Nichol Engineers

Gary L. Zahrt, Project Manager, Huber, Hunt & Nichols, Inc.

Ray Zunino, Project Director, Huber, Hunt & Nichols, Inc.

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